

CSE370: Database Systems

A. Course General Information:

Course Code:	CSE370
Course Title:	Database Systems
Credit Hours (Theory+Lab):	3+0
Contact Hours (Theory+Lab):	3+3
Category:	Program Core
Type:	Required, Engineering, Lecture + Laboratory
Prerequisites:	CSE221 Algorithms

B. Course Catalog Description (Content):

This course is designed as an introduction to relational database management systems (RDBMS) focusing on the efficient design, implementation and optimization of an RDBMS. Topics covered will include the advantages and disadvantages of DBMS, database architecture, data modeling using ER and EER models, relational integrity constraints, relational schema mapping from ER/EER, indexing, hashing and normalization. SQL Query formulation will be extensively practiced in both the theoretical and laboratory components of the course. The course includes a compulsory 3 hour laboratory work each week as CSE370L. Students must complete several hands-on SQL assignments and a group project for the laboratory work. The group project will involve the design and implementation of a complete database system including a user interface

C. Course Objective:

The objectives of this course are to:

- Explain fundamental concepts related to database management and Identify different database concepts discussed in a given scenario.
- Apply Entity-Relationship (ER) and Enhanced Entity-Relationship (EER) models, schema design principles, and normalization techniques to represent and optimize complex data requirements of an organization or system.
- Apply appropriate indexing and hashing techniques to optimize database performance.
- Implement standard queries using Structured Query Languages (SQL) to store, retrieve, and manipulate data.
- Develop a database application as a group project using SQL and other effective programming languages to solve a complex data management problem.

D. Course Outcomes (COs):

Upon successful completion of this course, students will be able to

Sl.	CO Description	Weightage (%)
CO1	Explain fundamental concepts related to database management and Identify different database concepts discussed in a given scenario.	15
CO2	Apply Entity-Relationship (ER) and Enhanced Entity-Relationship (EER) models, schema design principles, and normalization techniques to represent and optimize complex data requirements of an organization or system.	35
CO3	Apply appropriate indexing and hashing techniques to optimize database performance.	12
CO4	Implement standard queries using Structured Query Languages (SQL) to store, retrieve, and manipulate data.	22
CO5	Develop a database application as a group project using SQL and other effective programming languages to solve a complex data management problem.	16

E. Mapping of CO-PO-Taxonomy Domain & Level- Delivery-Assessment Tool:

Sl.	CO Description	POs	Bloom's taxonomy domain/level	Delivery methods and activities	Assessment tools
CO1	Explain fundamental concepts related to database management and Identify different database concepts discussed in a given scenario.	(a)	Cognitive/Understand	Lectures, Notes, Classwork	Exam
CO2	Apply Entity-Relationship (ER) and Enhanced Entity-Relationship (EER) models, schema design principles, and normalization techniques to represent and optimize complex data requirements of an organization or system.	(a)	Cognitive/Apply	Lectures, Notes, Practice Sheets, group activity for project	Exam, Project
CO3	Apply appropriate indexing and hashing techniques to optimize database performance.	(a)	Cognitive/Apply	Lectures, Notes, Practice Sheets, group activity for project	Exam

CO4	Implement standard queries using Structured Query Languages (SQL) to store, retrieve, and manipulate data.	(c)	Cognitive/App ly	Lectures, Notes, Practice Sheets	Exam
CO5	Develop a database application as a group project using SQL and other effective programming languages to solve a complex data management problem.	(e)	Psychomotor/ Manipulation	Lab Work, Lectures, Practice Sheets	Project

F. Course Materials:

i. Text and Reference Books:

Sl.	Title	Author(s)	Publication Year	Edition	Publisher	ISBN
1	Fundamentals of Database Systems	Ramez Elmasri, Shamkant B. Navathe	2015	7 th ed.	Pearson	ISBN-13: 978-0133970777
2	Database systems : a practical approach to design, implementation, and management	Thomas M. Connolly, Carolyn E. Begg	2014	6 th ed.	Pearson	ISBN-13: 978-0132943260
3	Database Systems Concept	Silberschatz, Korth, Sudarshan	2011	6 th ed.	McGraw-Hill	ISBN: 978-0-07-352332-3

ii. Other materials:

- Lecture slides
- Lab handouts
- Command Line tool (MySQL Mini Server)

G. Lesson Plan (Theory):

No	Topic	Week/Lecture#	Related CO (if any)
1	Introduction - Fundamental Database System Concepts	Week 1/ Lecture 1-2	CO1

2	Data Modeling using the Entity-Relationship (ER) Model	Week 2/ Lecture 3-4	CO2
3	The Enhanced Entity-Relationship (EER) Model	Week 3/ Lecture 5-6	CO2
4	The Relational Data Model and Relational Database Constraints	Week 4/ Lecture 7-8	CO1
5	Review	Week 5	
MIDTERM - Week 6			
6	ER/EER to Relational Database Schema Mapping	Week 7-8/ Lecture 11 - 13	CO2
7	Functional Dependencies and Normalization	Week 8/ Lecture 14	CO2
8	Indexing and Hashing	Week 9-10/ Lecture 15-17	CO3
9	Transaction Processing	Week 10-11/Lecture 18-19	CO1
9	SQL Queries	Week 11/Lecture 20	CO4
10	Review	Week 12	
FINAL			

Lesson Plan (Laboratory):

No	Topic	Week/Lecture#	Related CO (if any)
	Introduction to MySQL: Environment setup, database and table creation, data insertion, alter table	Week 1	CO4
	Update and Delete queries, basic select queries: retrieve and sorting	Week 2	CO4
	Aggregate Functions, Nested and Sub queries, Grouping	Week 3	CO4
	Lab Assessment/Review	Week 4	
	Primary and Foreign keys, basic join queries	Week 5	CO4
	Advanced Join Queries	Week 6	CO4
	Lab Assessment/Review	Week 7	

	ER/EER Diagram and schema for group project	Week 8-9	CO2
	User Interface for group project and connection with MySQL using suitable programming language such as php/java/python	Week 10-11	CO4, CO5
	Project Demonstration	Week 12	CO5

H. Assessment Tools:

Assessment Tools	Weightage (%)
Assignment	5
Quiz	10
Midterm	20
Final	35
Project	20
Lab work	10

I. CO Assessment Plan:

Assessment Tools	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Midterm	M	H			
Final	M	H	H	H	
Project		M			H
Lab work				H	