Course Description and Outcome Form
Department of Computer Science and Engineering
School of Engineering and Computer Science
Brac University

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
Co-requisites:	None

B. Course Catalog Description (Content):

This course is designed as an introduction to relational database management systems (RDBMS). The principles of database management systems, RDBMS architecture and comparison with file based data management systems will be discussed. Moreover, students will be introduced to database design using Entity-Relationship models, Relational database schema, functional dependencies and normalization. An overview of relational algebra, transaction management, database integrity and security will also be provided. 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:

a. introduce students to relational database management systems
b. teach students the methods for storing, manipulating and retrieving data using structured query language (SQL)
c. explain the design process of a database management system using ER and EER models
d. teach the process of mapping ER and EER diagrams to a relational schema
e. introduce functional dependencies and normalization for superior database design
f. introduce students to relational algebra
g. discuss transaction management, security concerns and integrity issues
h. expose students to the process of implementing a complete database system project in a team using software tools, programming languages and SQL

D. Course Outcomes (COs):

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

Sl.	CO Description	Weightage (%)
CO1	**Describe** the theoretical concepts of database systems such as, database architecture, data redundancy, database transactions, database security, data integrity and **Express** queries using basic relational algebra operators	10
CO2	**Design** database systems using ER/EER models to fulfill complex data requirements of an organization or system	20
CO3	**Apply** relational schema algorithm for mapping ER/EER models	20
CO4	**Prepare** and **Implement** standard queries using Structured Query Languages (SQL) to store, retrieve and manipulate data	20
CO5	**Apply** principles of functional dependencies, normalization and integrity constraints to improve database schema design	15
CO6	**Develop** a database application using SQL and other effective programming languages as a group project to solve a complex data management problem.	10
CO7	**Display** team-work and commitment through active cooperation and responsible participation in group project related activities	5

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

Sl.	CO Description	PLOs	Bloom's taxonomy domain/level	Delivery methods and activities	Assessment tools
CO1	**Describe** the theoretical concepts of database systems such as, database architecture, data redundancy, database transactions, database security, data integrity and **Express** queries using basic relational algebra operators	PLO1 (a)	Cognitive/Understand	Lectures, Notes	Exam
CO2	**Design** database systems using ER/EER models to fulfill complex data requirements of an organization or system	PLO3 (d)	Cognitive/Create	Lectures, Notes	Exam, Assignment/Quizzes Project
CO3	**Apply** relational schema algorithm for mapping ER/EER models	PLO1 (a)	Cognitive/Apply	Lectures, Notes	Exam, Assignment/Quizzes, Project
CO4	**Prepare** and **Implement** standard queries using Structured	PLO5	Cognitive/Apply	Lab Class,	Lab Work,

	Query Languages (SQL) to store, retrieve and manipulate data	(e)	Psychomotor/Manipulation	Lectures	Assignment/Quizzes, Exam, Project
CO5	**Apply** principles of functional dependencies, normalization and integrity constraints to improve database schema design	PLO1 (b)	Cognitive/Apply	Lectures, Notes	Assignment/Quizzes, Exam
CO6	**Develop** a database application using SQL and other effective programming languages as a group project to solve a complex data management problem.	PLO3 (c)	Cognitive/Create Psychomotor/Manipulation	Lab Class	Project
CO7	**Display** team-work and commitment through active cooperation and responsible participation in group project related activities	PLO9 (i)	Affective/Characterization	Lab Class	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	7th ed.	Pearson	**ISBN-13:** 978-0133970777
2	Database systems : a practical approach to design, implementation, and management	Thomas M. Connolly, Carolyn E. Begg	2014	6th ed.	Pearson	**ISBN-13:** 978-0132943260

ii. Other materials:

- a. Lecture slides
- b. Lab handouts
- c. Command Line tool (MySQL Mini Server)

G. Lesson Plan (Theory):

No	Topic	Week/Lecture#	Related CO (if any)
1	Introduction, Databases and Database Users	Lecture 1-2	CO1
2	Database Systems Concepts and Architecture	Lecture 3-4	CO1
3	Data Modeling using the Entity-Relationship (ER) Model	Lecture 5-7	CO2
4	The Enhanced Entity-Relationship (EER) Model	Lecture 8-10	CO2
5	The Relational Data Model and Relational Database Constraints	Lecture 11-12	CO1
MIDTERM			
6	ER/EER to Relational Database Schema Mapping	Lecture 12-15	CO3
7	Functional Dependencies	Lecture 16	CO5
8	Normalization	Lecture 17-19	CO5
9	Relational algebra	Lecture 20	CO1
10	Transaction management	Lecture 21	CO1
11	SQL Queries	Lecture 22-24	CO4
FINAL			

Lesson Plan (Laboratory):

No	Topic	Week/Lecture#	Related CO (if any)
	Introduction to MySQL: Environment setup, database and table creation, data insertion	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	C04
	Lab Assessment Exam 1	Week 4	
	Primary and Foreign keys, basic join queries	Week 5	CO4
	Advanced Join Queries	Week 6	CO4
	Lab Assessment Exam 2	Week 7	
	ER/EER Diagram and schema for group project	Week 8-9	CO2,CO3, CO7
	User Interface for group project and connection with MySQL using suitable programming language such as php/java/python	Week 10-11	CO6, CO7
	Final Project Demonstration	Week 12	

H. Assessment Tools:

Assessment Tools	Weightage (%)
Class Performance and Attendance	5
Assignment	10
Quiz	10
Midterm	15
Final	30
Project	20
Lab work	10

I. CO Assessment Plan:

Assessment Tools	Course Outcomes						
	CO1	CO2	CO3	CO4	CO5	CO6	CO7
Assignment/Quizzes	✓	✓	✓	✓	✓		
Midterm	✓	✓					
Final	✓		✓	✓	✓		
Project		✓	✓	✓		✓	✓
Lab work				✓			

J. CO Attainment Policy:

As per Department of CSE Course Outcome Attainment Policy

K. Grading policy:

As per Brac University grading policy

L. Course Coordinator: Najeefa Nikhat Choudhury