



Department of Computing and Information System

Mid-Term Semester Project: Spring-2025

Program: B.Sc. in CIS

Course Code: CIS222 and CIS222L

Course Title: Database Management System with Lab

Total Marks: 60

[Instructions: Give clear and concise answers for every task. Use examples if necessary]

Scenario

A **Database Management System (DBMS)** course provides a comprehensive introduction to the design, implementation, and management of databases. It typically covers fundamental concepts such as data models (hierarchical, network, and relational), database architectures, and database design theory.

Students learn about relational databases, where data is stored in tables and managed using Structured Query Language (SQL) for querying, updating, and manipulating data. Key topics include normalization, entity-relationship (ER) modeling, and indexing techniques, which optimize database performance and ensure data integrity. The course also explores transaction management, concurrency control, recovery mechanisms, and security, emphasizing how databases handle multiple user interactions and safeguard data against failures or unauthorized access. Additionally, advanced DBMS concepts such as distributed databases, NoSQL databases, and cloud-based solutions may be introduced, offering insights into modern trends and technologies in database management. Overall, this course equips students with practical skills to design and maintain efficient, secure, and scalable databases for various applications in business, technology, and research.

Recently, two friends from the CIS department, **Mr. Fahim** and **Mr. Minhaj**, decided to create a database for a competition organized by the Faculty of Science and Information Technology at DIU. Seeking guidance, they reached out to their DBMS course instructor, **Mr. Mehedi**. He shared various database examples with them, including a library management system, a hotel management system, a

blood donation system, a healthcare organization system, an online retail application, and the DIU student database.

After reviewing the options, they chose to work on the DIU student database. Their first step was conducting a requirement analysis. A week later, **Mr. Mehedi** called them to discuss the project's progress. Following this discussion, he provided them with a detailed project description based on their chosen database.

The project description is “**DIU** needs a system to track various aspects of student information. The database should contain detailed records for each student, including their *ID, Name, Date of Birth, Address (City and District), Age, and CGPA*. Each student is associated with one faculty member, and the database must store information about faculty members (such as *ID, Name, and Age*) who supervise the students. Each faculty member supervises a student.

Additionally, each student works on one project or thesis (including details such as *Project ID* and *Project/Thesis Title*) for their final defense. The project or thesis is managed by a single student. The database must also track the courses students take, storing course details such as *Course ID, Course Name, Credits*, and whether the course includes a theory component. Teachers are assigned to various courses, so the database should include teacher information like *ID, Name, Address (Room Number and Floor), Email, and Phone Number*. Each student can register for multiple courses. Faculty members also advise students on their academic journey.”

Afterward, **Mr. Fahim** successfully sketched the ER diagram but faced difficulties while creating the relational model. However, **Mr. Minhaj** stepped in and helped resolve the issue. Together, they successfully completed the project. (*Note: Each table contains nine records, with the first record in the Student table holding your personal details and the remaining eight containing details of your friends.*)

After finishing the project, they participated in the competition. During the event, a faculty member from the CIS department, **Mr. Abdullah**, posed ten queries, which they successfully answered using their database.

Query 1: Find students who registered for more than two courses.

Query 2: Find teachers whose email contains 'diu' and their phone number starts with '017'.

Query 3: Find students who are from 'Dhaka' but have CGPA greater than 3.65.

Query 4: Find students who are NOT from 'Dhaka' or 'Chittagong'.

Query 5: Find students who are taking courses with Course IDs CIS222, CIS223, or CIS224.

Query 6: Find projects that have 'Library' or 'AI' in the title.

Query 7: Find students aged between 20 and 24, and whose CGPA is greater than 3.71.

Query 8: Find courses without students enrolled.

Query 9: List courses with more than one student enrolled.

Query 10: Find students supervised by a specific faculty (FacultyID = 7100028XX). ['XX' = Last two digits of your Student ID]

As a result of their outstanding performance, they secured first place in the competition. The head of the department personally congratulated them on their achievement.

Theory Part (marks - 35)

Task-1

Marks - 10

Q1. Why are they chosen for the *DIU student database* rather than others? Justify your opinion. [3] [CO 1]

Q2. What kind of issues might **Mr. Fahim** encounter when resolving the Relational Model? Explain your opinion. [4] [CO 1]

Q3. What type of entity is described by **Mr. Mehedi** through the discussion on the *blood donation system*? Briefly explain. [3] [CO 1]

Task-2

Marks - 25

Q4. Visualize the Perfect ER diagram that is prepared by **Mr. Fahim**. [5] [CO 3]

Q5. Create a data dictionary for the specified competition database, defining each entity, its attributes, data types, and identifying both primary and foreign keys. [6] [CO 3]

Q6. Visualize the Relational Model that is prepared by **Mr. Minhaj**. [4] [CO 3]

Q7. Write down the SQL solutions that are provided by both **Mr. Fahim** and **Mr. Minhaj** at the competition. [10] [CO 3]

Lab Part (marks - 25)

Task-1

Marks – 20

QL1. Display all the relations created by **Mr. Fahim** and **Mr. Minhaj** in MySQL based on the queries asked by **Mr. Abdullah**. [10] [CLO 4]

QL2. Display the output of the queries that are asked by **Mr. Abdullah**. [10] [CLO 4]

Task-2

Marks – 5

QL3. Explain details about your lab work (Task-1) and make a short video (at least 4 minutes). [5] [CLO 4]

General Instructions

- **Deadline:** 05th April, 2025
- You have to submit the assignment in .docx or .pdf format (name it with your ID, such as 232-16-XXX.pdf), **Zip the file if any supplementary files are needed.**
- Submit the assignment in the **BLC Assignment section** and **Google Classroom**, the option of submission will be available there very soon.
- **Deadline is fixed, no excuse will be considered if you missed the deadline.**
- Marks will be deducted accordingly if any plagiarism of work is provided.

You must submit the hardcopy of the semester project on the Final Viva day. If anyone is missing at the viva, marks will be deducted.