**Lab 4: Relational Database Design Process**

**Objective**

The objective of this lab is to guide students through the structured process of relational database design. Students will practice translating real-world requirements into a conceptual model, refining it into a logical model, and implementing it as a physical database schema. Additionally, students will specify the constraints that ensure data integrity within the designed schema.

**Tasks**

Each group is required to:

1. **Create the Conceptual Model (ERD)**
   * Develop an **Entity–Relationship Diagram (ERD)** based on the given or chosen domain.
   * Clearly identify entities, attributes, and relationships.
   * Indicate cardinalities (1:1, 1:N, M:N).
2. **Develop the Logical Model**
   * Convert the ERD into a **relational schema (Logical Diagram)**.
   * Define primary keys and foreign keys.
   * Resolve M:N relationships through appropriate decomposition.
3. **Design the Physical Model**
   * Map the logical schema to a **Physical Diagram**.
   * Include table definitions with attributes and data types.
4. **Specify Constraints**
   * Provide a detailed description of **column-level and table-level constraints**, including:
     + **NOT NULL**
     + **UNIQUE**
     + **PRIMARY KEY**
     + **FOREIGN KEY** (with referenced table and column)
     + **CHECK constraints** (e.g., value ranges, formats)
     + **DEFAULT values** (if any)
5. **Document Results**
   * Summarize the database design process followed by the group.
   * Reflect on how constraints improve data integrity and reliability.

**Submission Format**

* **File type:** Microsoft Word (.doc/.docx) or PDF (.pdf)
* **Report structure:**
  1. Cover page (Lab number, course name, group members, date).
  2. Objective.
  3. Entity–Relationship Diagram (ERD).
  4. Logical Diagram with relational schema.
  5. Physical Diagram with detailed table design.
  6. List and description of constraints.
  7. Conclusion and reflection.