**OREM 5353/7353**

**Spring 2023**

**COURSE PROJECT**

Students are required to complete a group project, which will require the necessary steps to design and implement a fully functional database system.

Students will work in groups as stated in the table below:

|  |  |  |
| --- | --- | --- |
| **NAME** | **Email address** | **Group** |
| Jacobson,Justin | jacobsonj@smu.edu | 1 |
| McPherson,Elizabeth Anne | emcpherson@smu.edu | 2 |
| Sun,Yuxuan | yuxuans@smu.edu | 3 |
| Xia,Tianmiao | tianmiaox@smu.edu | 4 |
| Chackola,Suma | schackola@smu.edu | 1 |
| Huddleston,Ashley Elizabeth | ahuddleston@smu.edu | 2 |
| Reyes,Rebeca | rebeca@smu.edu | 3 |
| Stojka,Isabella Dorothy | istojka@smu.edu | 4 |
| Whitbeck,Kendall Parrish | kwhitbeck@smu.edu | 4 |

Groups are asked to perform below steps by Due Dates:

1. Due Date: Feb 2 (Group formation) : Communicate among members and select a group leader. The group leader will send an email to the instructor [candan@smu.edu](mailto:candan@smu.edu) by copying all members to confirm the formation of the group and the selection of the group leader.
2. Due Date: Feb 9 (Topic Selection): Discuss and select a topic for Database design and implementation that addresses a real life situation and is feasible to implement. Include a maximum one-page description of the group’s motivation (why choose this particular project), where you expect your design to be used in real life.

Following is a list of potential topics to consider, but the groups are welcome and encouraged to come up with their own project topic.

Some topics to consider:

- A shopping cart implementation

- E-commerce transactions

- Online banking

- Non-for profit organization automation (library, museum, etc.)

- University Information System (student registration, faculty, course schedules,)

- A rental system involving one or more of the following: vehicles, video, audio, and others

- An inventory control system

- A hospital database system

Once the group determines a topic, the group leader sends the topic and the write up to the instructor for approval. All communication from the group leader to the instructor will be copied to all group members.

1. Due Date: March 18 (Project mid-term Review). Group reviews the work for Part 1 and Part 2 in the class in a short presentation format. Group also will give a roadmap for the completion of the project and review what is left. Each group will have up to 15 minutes.
2. Due Date: April 20 (Project paper and presentation submission). Group submits project paper and its presentation. Group leader will perform this submission by email to the instructor copying all group members. The paper is made up of three parts. The detailed requirements for the project paper are as follows:

- Title of your database system.

- Group members and delegation of their tasks (include who contributed which content).

# Part1: Introduction and Literature Work

- An introduction of your database including why you have chosen to design this particular database. Indicate which real-world problem(s) you think your design will help solve.

- Comparison of your work with existing similar databases, if any. For this, please make a literature search for similar database applications and cite them in your report properly in the references section. The references should be numbered, and these numbers are properly cited in the project report.

# Part 2: ER Diagram without Normalization

- ER diagram of the Database without Normalization

- Based on the ER diagram, draw the schema diagram of your design using a tool, rather than drawing manually. Specify Primary Keys, Foreign Keys and referential integrity constraints in the schema. Please take this as an opportunity to learn and master new tools to help your work in database design and implementation. Also, remember that this experience will help you get valuable skill sets that would be useful in your profession. Include these tools (name, url, etc.) in the references section and cite them in your deliverable.

- Implement your design to create the database, tables, and also populate your tables with some reasonable data. Your design should contain minimum:

EMIS 5353: 4 different tables, and minimum 8 tuples per table.

EMIS 7353: 6 different tables, and minimum 10 tuples per table.

# Part 3: Normalization

- Normalize all of your tables in your database to 3NF. Make any necessary changes to your ER diagram that you have in Part 2. Clearly explain why these changes needed to be made. Please note that it is ok to have to change your initial design as long as you record these changes in the project report, so that now your database tables are all in 3NF.

- Draw a dependency diagram for each table.

- Use minimum:

EMIS 5353: two CREATE VIEW statements

EMIS 7353: four CREATE VIEW statements

in your database to implement a view based on your specific database design.

- Create these new tables in SQL and perform Insert, Delete, Select, and other simple and complex queries (Joins, Aggregates, etc.) commands with screen shots.

1. Due Date: April 22. (In-class group presentations). Group will present its complete work and demo the implementation during class hours on April 22. Each group member is expected to take part in the group presentation. Each group will have 20 minutes to present.

# Tools that you can use:

**ER Diagram drawing tools:**

* MS Visio (a 60-day trial version is available at <http://technet.microsoft.com/en-US/evalcenter/hh973399?WT%2Eintid1=ODC_ENUS_FX103791368_XT104000916>)
* Modelio (Free at <http://archive.modeliosoft.com/en/products/modelio-free-edition.html>)
* Creatly (Free at <http://creately.com/>)
* Balsamiq mockups (Free at <http://www.balsamiq.com/products/mockups>)
* IBM Rational Software Architect (RSA) (available via Dreamspark)
* etc.

**Relational DBMS:**

* Microsoft Access
* Microsoft SQL Server 2012 (available at open lab computers, also via Dreamspark)
* Oracle <http://cs.utdallas.edu/about/Oracle%20help.htm>
* Any DBMS that you have legal access.
* etc.