Module Code Module Name Assignment Specification (Year)	
Module Leader	Theja Nadeeshani Perera
Stage	Year 1
Unit (Group/Individual)	Individual
Weighing	40%
Qualifying Mark	40
Learning Outcomes Covered in this Assignment:	Implement and test a relational database using a query language with a suitable interface.
Handed Out Date	2nd Week – 20th February 2021
Due Date	11th Week - 20th of April 2021
Expected Deliverable	Report [No word count]
Method of Submission	Soft copy of the report and SQL file with coding should be submitted to the Moodle
Method of Feedback and Due Date	Rubric based feedback
BCS Criteria(Pending) Met by this Assignment	

Assessment Regulations

Refer to the "How you are assessed section" in the Student Handbook for undergraduate students for a clarification of how you are assessed, penalties and late submissions, what constitutes plagiarism etc.

Penalty for Late Submission

Coursework received late without valid reason shall not be accepted and shall receive no grade, but shall count as one of the assessment opportunities prescribed in paragraph 9 of **RGU Academic Regulation A4 section 4.3.**

It is recognized that on occasion, illness, personal crisis or other valid circumstances can mean that you fail to submit and/or attend an assessment on time. In such cases you must inform the School of any extenuating circumstances through a ***Coursework Extension Form*** or a ***Deferral Request Form***, with valid evidence for non-submission of an assessment up to a maximum of five working days after the assessment submission date. This information will be reported to the relevant Assessment Board that will decide whether a student should be allowed to reattempt without penalty (a deferral). For more detailed information regarding University Assessment Regulations and accessing forms, please refer to the following website: www.rgu.ac.uk/academicregulations www.rgu.ac.uk/academicregulations

Grading

Marks will be awarded for the coursework based on the provided Grading Grid. These marks will be mapped onto a grade scale from A-F as determined by the individual module coordinator.

Coursework Specification

Consider the given scenario as a hypothetical situation.

ZEO Builders are well established construction company that have built more than 10,000 houses and buildings over past 20 years. They have branches in all main cities in the country. Assume that they have hired you as an AI & Data Science engineer to fully automate their system using Artificial Intelligence. This system will support them in decision making and understanding customer behaviors without extra effort. This predictions can support to improve the business performance and customer satisfaction levels.

To achieve these ZEO uses a database management system to store data. The database should store all branches details, Branch can be explained using branch code, location. Employee details are needed to be recode employee id, name, contact number, address should be under employee details. Supervisor also an employee but he manages other employees. Other than employee supervisors are having allowances and vehicle. Employees may or may not have an assigned supervisor.

Each branch has many construction sites, sites can be explained by their code, location, estimation and status. Employees and supervisors are assigned to a construction site. Each construction site has a customer. When recoding customer details they consider on customer id, name, address, contact number, email .Customer make payment on their construction site. Payment id, amount, invoice number should be recoded under payments. Customers make payments multiple times since they are allowed to go under installment plans.

You have been hired by ZEO as an AI database architect to undertake a database project to support the data needs required by the business processes of the organization. Your goal in here is to produce a high-quality CONCEPTUAL RELATIONAL DATA MODEL, LOGICAL -RELATIONSHIP SCHEMA, AND IMPLEMENT relevant tables using an appropriate DBMS tool. An executive report should be provided to justify your decisions.

1) Produce a complete Conceptual Entity-Relationship Diagram for ZEO. This needs to include all the entity types, relationship types, multiplicity constraints, attributes and primary keys .This needs to fit on one page of the report.

   If you have made any assumptions mention all near the ER diagram.

   5- Marks (1 for Identification of each correct Entity)

   5 – Marks (1 Mark for Identification of each correct relationship)

5- Marks (1 Mark for Identification of each correct primary key among other attributes)

5 – Marks (Drawing correct ER diagram with identified entities, relationships, attributes and multiplicities)

2) Produce a complete **Logical Schema Diagram** for ZEO. This needs to include all the **correct relations, relationships, multiplicity constraints, attributes, primary keys** and **foreign keys**. This needs to fit on one page of the report.

   Data types for the attributes also can be added.

   4 – Marks (Correct identification of all relations)

   4- Marks (Correct identification and mapping of primary keys /multi valued attributes /composite attributes)

   4- Marks (Correct mapping of multiplicities)

   4-Marks (Correct mapping of foreign keys)

3) Normalization – If any issues occurred in the relational schema/ logical schema solve them using normalization. Provide justifications for UNF, 1NF, 2NF and 3NF. Explain how you achieve each step in normalization. -10 Marks (2 marks for each correct step) -

4) After finalized the normalized logical schema implement relations in MySQL database. Each table should contain primary key and attributes. Appropriate foreign key constraints should be used.(SQL code and generated table screenshots should be included)

   10- Marks (Identification and proper SQL code for table creation in the MySQL database)

   10 Marks (Application of foreign key constraints and primary key constraints)

5) Insert sample data to created tables. Each table should contain 5 sample data.

(SQL code and inserted data to tables' screenshots should be included) (10 – Marks, each correct table will get 3 Marks)

6) Perform below given questions with SQL codes and their output (code and output screenshots should be provided.)

I. Write select query to find out construction site details where estimated cost is less than or equal to 20 million - 5 Marks

II. Write a select query to find out customer details who make payments more than 1 million at a time - 5 Marks

III. Write a SQL for left outer join and right outer join for customer and construction site table.
2.5 marks for each query - Total 5 Marks

IV. Make all customers in to descending and ascending order according to the name
2 marks for each query and output Total 4 Marks

V. Find out which customer makes which payment for which construction site and make it in to ascending order by payment amount - 5 marks