

Coursework Specification

CW_Specification_CSI_5_BDD_22/23

Read this coursework specification carefully, it tells you how you are going to be assessed, how to submit your coursework on-time and how (and when) you'll receive your marks and feedback.

Module Code	CSI-5-BDD
Module Title	Big Data & Database Systems
Lecturer	George Ubakanma
% of Module Mark	60%
Distributed	07 MAR 2023
Submission Method	Submit online via this Module's Moodle site
Submission Deadline	04 May 2023 @ 16:00
Release of Feedback & Marks	Feedback and provisional marks will be available in the Gradebook on Moodle within 15 working days of submission.

Coursework Aim:

To demonstrate understanding of the module subject matter and the ability to apply it, including critical analysis and judgement. To achieve this, you are allocated to 1 of specific case study from a set of 3 available (either, case study: A, B or C). The given case must be analysed, and a design data model produced. Then using MS SQL Server, a relational database prototype with specific query and procedural/programming functionality must be implemented, complete with a dashboard built utilising Tableau or Power BI. Finally, a brief 10 min video demo of Tasks 4, 5 must be recorded using MS Teams. You must do the case allocated to you... your tutor will confirm.

Coursework Details:

Type:	Report on Prototype Database Development task
Word Count:	No formal word count is required but no more than 2500 words would be expected. Footnotes will not count towards word count totals but must only be used for referencing, not for the provision of additional text. The bibliography will not count towards the word total.
Presentation:	<ul style="list-style-type: none"> Any quoted material must be referenced, and a bibliography provided, however, formal referencing is not an assessed criterion – however the identification of technical resources consulted in order to solve specific described problems is an assessed criterion (see main task specification) Work must be submitted as a Word document (.doc/docx)

	<ul style="list-style-type: none"> Course work must be submitted using Arial font size 11 (or larger if you need to), with a minimum of 1 line spacing Your student number must appear at the front of the coursework. Your name must <u>not</u> be on your coursework.
Referencing:	Harvard Referencing should be used, see your Library Subject Guide for guides and tips on referencing.
Regulations:	<p>Make sure you understand the University Regulations on expected academic practice and academic misconduct. Note in particular:</p> <ul style="list-style-type: none"> Your work must be your own. Markers will be attentive to both the plausibility of the sources provided as well as the consistency and approach to writing of the work. Simply, if you do the research, practical and reading, and then write it up on your own, giving the reference to sources, you will approach the work in the appropriate way and will cause not give markers reason to question the authenticity of the work. All quotations must be credited and properly referenced. Paraphrasing is still regarded as plagiarism if you fail to acknowledge the source for the ideas being expressed. <p>TURNITIN: When you upload your work to the Moodle site it will be checked by anti-plagiarism software.</p>

Learning Outcomes

This coursework will fully or partially assess the following learning outcomes for this module.

On completion of the module you will be able to:

- Critically discuss and evaluate a broad range of data management & big data issues including data
- administration, integrity and security.
- Discuss the continuing development of big data - database technologies/ applications and the need for continued study, reflection, and development throughout a career as a database professional.
- Design, implement, query and secure database applications and Internetworking for database systems
- Develop skills for both autonomous and independent practice, including oral and written communication skills

Assessment Criteria and Weighting

LSBU marking criteria have been developed to help tutors give you clear and helpful feedback on your work. They will be applied to your work to help you understand what you have accomplished, how any mark given was arrived at, and how you can improve your work in future.

Full details of the criteria, interpretation, weightings and rubric to be applied are included in the main task specification below.

How to get help

We will discuss this Coursework Specification in class. However, if you have related questions, please contact me:

George Ubakanma: ubakang@lsbu.ac.uk as soon as possible.

Resources

Course materials and Tutorials linked to from the exercises are expected to be the main resources required for this assignment.

Quality assurance of coursework specifications

Coursework specifications within CSI division go through internal (for new modules with 100% coursework also through external) moderation. This is to ensure high quality, consistency and appropriateness of the coursework as well as to share best practice within the CSI division.

Details of the moderators for this coursework specification are below:

Moderated (internal)	Brahim El Boudani
Moderated (CSI lead)	[George Ubakanma, Mar 2021]
Signed off by (HoD/DHoD)	[George Ubakanma, Mar 2021]

-----For Internal use by CSI lead only-----

Changes required to CW?	No *
Examples of good practice	The case studies are very clear and required tasks are also relevant to the materials provided.

* if changes are required, moderator to complete the below:

List of changes required	N/A
ML Response	[ML response, date]
Moderator Response	[ML response, date]

EXAMPLE CASE STUDY

Starlabs Library.

The Starlabs University Library has approximately 45,000 members, 100,000 titles, and 250,000 volumes (an average of 2.5 copies per book). About 10 percent of the volumes are out on loan at any one time. The librarians ensure that the books that members want to borrow are available when the members want to borrow them. Also, the librarians must know how many copies of each book are in the library or out on loan at any given time.

A Catalogue of books is available that lists books by author, title, and subject area. For each title in the library a book description is kept in the catalogue that ranges from one sentence to several pages. The reference librarians want to be able to access this description when members request information about a book. Library staff includes chief librarian, departmental associate librarians, reference librarians, check-out staff and library assistants.



Books can be checked out for 21 days. Members are allowed to have only five books out at a time. Members usually return books within three to four weeks. Most members know that they have one week of grace before a notice is posted to them, so they try to return books before the grace period ends. The paperwork for all of the borrowing is done by check-out staff and library assistants.

About 5 percent of the members have to be posted reminders to return books. Most overdue books are returned within a month of the due date. Approximately 5 percent of the overdue books are either kept or never returned.

The most active members of the library are defined as those who borrow books at least ten times during the year. The top 1 percent of membership does 15 percent of the borrowing, and the top 10 percent of the membership does 40 percent of the borrowing. About 20 percent of the members are totally inactive in that they are members who never borrow.



CSI_5_BDD: Coursework CASE STUDY A

Coursework Mar 2023 – May 2023

To become a member of the library, applicants fill out a form including: their Student Id, campus and home addresses, and phone numbers.

The departmental associate librarians and reference librarians can issue a numbered, machine-readable card with the member's photo on it. This card is valid for four years. A month before a card expires, a notice is sent by post to a member for renewal.

Professors & Researchers at Starlabs University are considered automatic members. When a new faculty member joins Starlabs, his or her (information is pulled from the employee records and a library card is posted to his or her campus address. Professors & Researchers are allowed to check out books for three-month intervals and have a two-



week grace period. Renewal notices to Professors & Researchers are posted to their campus address. The library does not lend some books, such as reference books, rare books, and maps. All librarians must differentiate between books that can be lent and those that cannot be lent. It is hoped that the new systems will be able to automatically alert librarians when non lendable items are presented at the lending desk. In

addition, the departmental associate librarians and reference librarians have a list of some books they are interested in acquiring but cannot obtain, such as rare or out-of-print books and books that were lost or destroyed but have not been replaced. When necessary inter-library loans with external libraries (e.g. LSBU Perry Library, the IEEE library etc...) are arranged

Some books may have the same title; therefore, the title cannot be used as a means of identification. Every book is identified by its International Standard Book Number (ISBN), a unique international code assigned to all books. Two books with the same title can have different ISBNs if they are in different languages or have different bindings (hardback or paperback). Editions of the same book have different ISBNs.

The current system as described is largely manual and paper based. The proposed information system must be designed to keep track of the members, the books, the catalogue, and the borrowing activity, with the system managing as much of the lending/return and security of books and other library resources as possible,



You are required to design a new prototype information system suitable for all of Starlabs needs.

END OF CASE STUDY

CSI_5_BDD: Coursework CASE STUDY A

Coursework Mar 2023 – May 2023

MARKING SCHEME AND TASKS

Complete ALL tasks listed below. Every task must be accompanied by a brief narrative (max 1 side A4 per task) discussing the task production (your attempt success/failures)

	TASK	Mark	Weight	TOTAL
1	Subject Knowledge - Design Draw a complete Entity Relationship Diagram for the case study. Include all primary/foreign keys as part of your answer. (Consider & carefully the attributes required to complete tasks 3 & 4 when you are choosing appropriate attributes)	10	1	10
2	Subject Knowledge - Design Produce a set complete Functional Dependency statements for the case study to prove that all of the attributes within your entities are in at least 3NF/BCNF (Consider & discuss carefully the attributes required to complete task 4 when you are choosing appropriate attributes).	10	1	10
3	Critical Analysis – Transforming design to implementation Using suitable relational database software (MS SQL Server) Set-up all tables, including your own, well-designed test data (minimum 20 records per table), to implement your design as a database. (Provide screenshots of all SQL creation statements including any T-SQL where appropriate, also the sample tables & data.)	10	1.5	15
4	Set-up and test all of the following queries using Structured Query Language – SQL (provide screenshots of all SQL including any T-SQL where appropriate for each task and the task output):			
a	Write a query to find all books that are overdue (by at least 3 days) for return to the library.	10	0.5	5
b	Write a query to produce a list of customers who have made less than 5 loans in the past 3 months. Show appropriate customer and loan details in your answer.	10	0.5	5
c	Write a query to produce the weekly lending report (loan-item-id description, start-date-time, due-date-time, actual-return-date-time, lender details)	10	1	10
d	Write a stored procedure to provide a report showing current inter-library loans, showing all current inter-library loan items, including the partner library who loaned the item to Starlabs, the item details and the current loan duration calculated in days.	10	1	10
e	Write a stored procedure to provide a report showing a monthly itemized statement of loans for each lender. The procedure should be able to accept appropriate parameter values to enable dynamic search by week, month or quarter (3 months) Include appropriate payment, tax (at 20% vat), and totals in your report	10	1.5	15
5	Produce a dashboard combining 4-6 visualized elements, that can be used to tell an effective story about the business in your scenario. Use either Tableau or Power BI	10	1	10
6	Use MS Teams to record a video demo (10 mins max) of the tasks 4 and 5. During the video you demonstrate your live execution of Task 4 in SQL Server and Task 5 in either Tableau or PowerBI. Include the URL to the video in your report. Ensure your BDD tutor has permissions to VIEW the video.	10	1	10
				100%

Remember ALL tasks including screenshots evidence in a SINGLE MS Word doc for submission.

Marking Criteria

This assignment will be marked using an adaptation of the University's new standardised marking criteria. It is important that you pay attention to the criteria that will be applied and address them in the text of your report.

Please note that the primary criterion being assessed in this assignment is your understanding of the material and your ability to analyse and reason about it. Submitting a working program is not sufficient to demonstrate this and will not in itself obtain a high grade.

Note that marks are awarded for the following main criteria:

1. Subject Knowledge - Design (20%)

Understanding and application of subject knowledge. Contribution to subject debate.

Mainly assessed by your written explanation of system design Tasks 1-2.

2. Critical Analysis- Transforming design to implementation (15%)

Assessed by the quality of the critical evaluation supporting the practical work for efficiently coding the construction of the database. There should be a critical and evaluative supporting narrative evaluating the technical choices behind the implementation of Task 3

3. Testing and Problem-Solving Skills – TSQL Queries (45%)

Design, implementation, testing and analysis of product/process/system/idea/solution(s) to the SQL query tasks.

Assessed based on the TSQL queries and stored procedures you develop and document. It is important to note that very little credit will be given to any code/examples you provide without explanation. Task 4 (A-E)

4. Practical Competence - Dashboard Design + Implementation (10%)

Skills to apply theory to practice or to test theory.

Apply theories of dashboard design in an implementation of a multi visualization dashboard using a connection to your database from either Tableau or SQL Server. It is important to note that very little credit will be given to any code/examples you provide without explanation Task5

5. Personal and Professional Development – Video Demo (10%)

Record a video of your learning and innovation through self-direction, planning and reflection. Focus on Tasks 4-5

Assessed on the basis of the quality of your 10 min Video Presentation of Tasks 4-5.

CSI_5_BDD: Coursework CASE STUDY A

Coursework Mar 2023 – May 2023

RUBRIC

Please note the criteria weightings and general interpretation shown in bold capitals under each criteria.

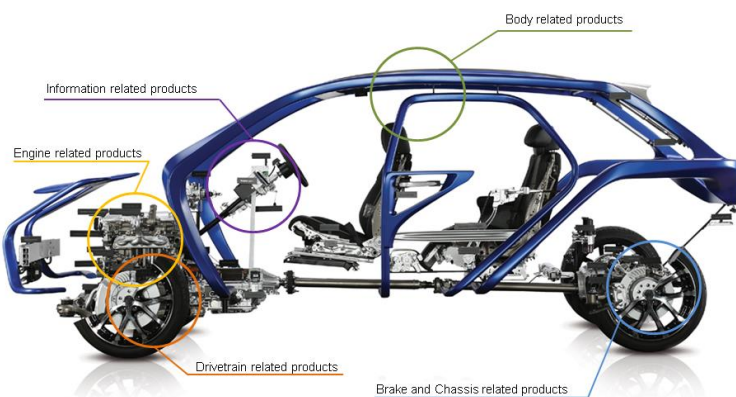
Criteria	Outstanding 100-80%	Excellent 79-70%	Very good 69-60%	Good 59-50%	Satisfactory 49-40%	Inadequate 39-30%	Very poor 29-0%
Subject Knowledge Understanding and application of subject knowledge/ application of appropriate techniques.. DESIGN SUBJECT KNOWLEDGE EXPLANATION 20%	Shows sustained breadth, accuracy and detail in understanding key aspects of subject. Contributes to subject debate. Awareness of ambiguities and limitations of knowledge.	Shows breadth, accuracy and detail in understanding key aspects of subject. Contributes to subject debate. Some awareness of ambiguities and limitations of knowledge.	Accurate and extensive understanding of key aspects of subject. Evidence of coherent knowledge.	Accurate understanding of key aspects of subject. Evidence of coherent knowledge.	Understanding of key aspects of subject. Some evidence of coherent knowledge.	Some evidence of superficial understanding of subject. Inaccuracies.	Little or no evidence of understanding of subject. Inaccuracies.
Critical Analysis Analysis and interpretation of design refinement. Structuring future proofing the model CRITIQUE DESIGN TRANSFER TO CODE 15%	Outstanding demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Excellent demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Very good demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Good demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Demonstration of critical analysis of the key possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Trivial demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Little or no critical analysis has been demonstrated.
Testing and Problem-Solving Skills Design, implementation, testing and analysis of product/process/system/idea/solution(s) to practical questions/problems IMPLEMENTATION OF SQL + PROCEDURES 45%	Outstanding implementation of all required software, with near perfectly organised, formatted and documented source code, and documented demonstration of runtime behaviour.	Excellent implementation of all required software, with well organised, formatted and documented source code provided	Competent implementation of all required software, with well organised, formatted and documented source code, and documented demonstration of runtime behaviour.	Implementation of all required software, with well organised, formatted and documented source code, and documented demonstration of runtime behaviour, with some missing/incorrect functionality or poor quality.	Implementation of most of the required software, with well organised, formatted and documented source code, and documented demonstration of runtime behaviour, with some missing/incorrect functionality or poor quality.	Implementation of only part of the required software, with well organised, formatted and documented source code, and documented demonstration of runtime behaviour, with some missing/incorrect functionality or poor quality.	Little or no functionality has been implemented.
Practical Competence Skills to apply theory to practice or to test theory USE OF DASHBOARD TOOLS 10%	Outstanding descriptions of factual information, programming techniques or theoretical explanations being found in technical or theoretical reference material.	Excellent explicit descriptions of all factual information, programming techniques or theoretical explanations that were found in technical or theoretical reference material.	Good explicit descriptions of all factual information, programming techniques or theoretical explanations that were found in technical or theoretical reference material.	Reasonable descriptions of most factual information, programming techniques or theoretical explanations that were found in technical or theoretical reference material.	Basic examples of the main factual information, programming techniques or theoretical explanations that were found in technical or theoretical reference material.	Some trivial examples of factual information, programming techniques or theoretical explanations being found in technical or theoretical reference material.	Little or no evidence of factual information, programming techniques or theoretical explanations being found in technical or theoretical reference material.
Personal and Professional Development Evidence Management of learning through self-direction, planning and reflection VIDEO DEMO 10%	Outstanding report organisation, structure, presentation, narrative voice and language.	Excellent report organisation, structure, presentation, narrative voice and language.	Very good report organisation, structure, presentation, narrative voice and language.	Good report organisation, structure, presentation, narrative voice and language.	Satisfactory report organisation, structure, presentation, narrative voice and language.	Poor report organisation, structure, presentation, narrative voice and language.	Report does not constitute a serious attempt at the assignment.

EXAMPLE CASE STUDY

LSBU AUTO SHOP

LSBU Auto Shop is a company specialising in the supply of vehicle parts. LSBU has two types of customers: retail and wholesale. All customers have a customer ID, a name, address, phone number, a default shipping address, a date of last purchase and a date of last payment.

Retail customers have a credit card number, credit card type, card expiry date and an email address. Wholesale customers have a contact name, contact phone number, contact email address, a purchase order number, a discount percentage, billing address, tax status (if exempt) and a VAT registration number. A retail customer cannot be a wholesale customer and vice versa.



LSBU Autos has five departments: administration, marketing, sales, shipping and purchasing. Each department employs many employees. Each employee has an ID, name, home address, home phone number, monthly salary and national insurance number. Some employees are classed as sales representatives, some as






technical support, and some as administrators. Sales Representatives receive a commission based on their sales.

Technical support employees are required to be certified in their area of expertise. For example, some are certified as brake system specialists, others as electrical systems specialists. All administrators have a title and a bonus.

LSBU Autos keeps a list of car models with information about the manufacturer, model and year. LSBU keeps several parts in stock. A part will have a part ID, description, unit price and quantity in stock. A part can be used for many car models, and a car model has many parts.

A retail customer pays by credit card and is charged the list price for each purchased

Recycled Parts Request: 2-DOOR UNIBODY FORM	
Date: _____	From: _____
To: _____	Contact Person: _____
Contact Person: _____	Contact Person: _____
Phone #: _____	Fax #: _____
Year: _____	Make: _____
Model: _____	VIN #: _____
P.O. #: _____	Build Date: _____

 PASSENGER SIDE	 DRIVER SIDE
 TOP VIEW	<p>Please use the area below for a detail of cut instructions:</p>  <p>Notes: _____</p>
 DRIVER SIDE	

CSI_5_BDD: Coursework CASE STUDY B

Coursework Mar 2023 – May 2023

item. A wholesale customer normally pays via purchase order with (30-day sale or return terms) and is charged a discounted price (5% taken off) for each item purchased.

A customer (wholesale or retail) may place many sales orders. Each sales order will have a sales order number, a date, a shipping address, a billing address and a list of part codes,



quantities, unit prices. Each sales order also has a sales representative ID (an employee) to identify the person who made the sale, a VAT total (VAT being charged at 20% of the total order value), an order total cost (including VAT) and an order status (complete,

incomplete, cancelled).

When a sales order is taken by a sales representative the order is sent to the warehouse where the staff will check the available stock levels (and the minimum stock level) to ensure that the parts required to fulfil the sales order are available with sufficient quantity in stock.

If sufficient parts are available in stock the required amount is taken and stock levels are adjusted accordingly. If not enough stock is available then the warehouse staff check to ensure the stock item is reordered immediately from the part supplier company.

A note is attached to the customer order noting the part is currently unavailable and advising an estimated delivery date for the part (usually within 24 hours).

Incomplete orders are put on hold until the parts become available. The customer is advised and is given the option to cancel or to proceed with the order.



If parts are available the order is completed, full payment is taken from the customer and delivery to the customer shipping address is arranged.

Consultant Database Analysts (you!) have been called in to design and build a prototype database.

END OF CASE STUDY

CSI_5_BDD: Coursework CASE STUDY B

Coursework Mar 2023 – May 2023

MARKING SCHEME AND TASKS

Complete ALL tasks listed below. Every task must be accompanied by a brief narrative (max 1 side A4 per task) discussing the task production (your attempt success/failures)

	TASK	Mark	Weight	TOTAL
1	Subject Knowledge - Design Draw a complete Entity Relationship Diagram for the case study. Include all primary/foreign keys as part of your answer. (Consider & discuss carefully the attributes required to complete tasks 3 & 4 when you are choosing appropriate attributes)	10	1	10
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3	Critical Analysis – Transforming design to implementation Using suitable relational database software (MS SQL Server) Set-up all tables, including your own, well-designed test data (minimum 20 records per table), to implement your design as a database. (Provide screenshots of all SQL creation statements including any T-SQL where appropriate, also the sample tables & data.)	10	1.5	15
4	Set-up and test all of the following queries using Structured Query Language – SQL (provide screenshots of all SQL including any T-SQL where appropriate for each task and the task output):			
a	Show employee details of sales reps with the highest and the lowest total number of sales orders.	10	0.5	5
b	Calculate totals for each sales order status category the total number of complete, incomplete and cancelled orders?	10	0.5	5
c	For each part having an available stock below the minimum stock level, show the suppliers who can supply that part.	10	1	10
d	Implement using triggers and/or stored procedures automatic re-ordering of parts when they drop below their minimum stock level.	10	1	10
e	Write a Stored Procedure that can generate a complete invoice for any customer. The invoice must include customer details, part details & quantities purchased, invoice totals before and after VAT has been added.	10	1.5	15
5	Produce a dashboard combining 4-6 visualized elements, that can be used to tell an effective story about the business in your scenario. Use either Tableau or Power BI	10	1	10
6	Use MS Teams to record a video demo (10 mins max) of the tasks 4 and 5. During the video you must demonstrate your live execution of Task 4 in SQL Server and Task 5 in either Tableau or PowerBI. Include the URL to the video in your report. Ensure your BDD tutor has permissions to VIEW the video.	10	1	10
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Record a video of your learning and innovation through self-direction, planning and reflection. Focus on Tasks 4-5

Assessed on the basis of the quality of your 10 min Video Presentation of Tasks 4-5.

CSI_5_BDD: Coursework CASE STUDY B

Coursework Mar 2023 – May 2023

RUBRIC

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EXAMPLE CASE STUDY

LSBU Manufacturing Ltd

LSBU owns a factory manufacturing various spare parts for commercial vehicles (e.g., vans, heavy goods vehicles, coaches, buses, etc...). They want to implement a database system to manage their operation.



Recently a team of analysts worked within the company and identified some basic requirements that LSBU recognises as specifications for its potential new information system, as follows:

The factory has several departments. (e.g., Design / Production/ Maintenance/Sales etc.) A department may have many employees, although each department must have at least three employees. Every employee works for one and only one department. Every department has a manager - with only one manager per department. Clearly a manager is an employee of the company, but not all employees are managers.

A department may have many production machines and every machine is assigned to a specific department. The machines are of varying types: Manual Lathes / Computer Aided Manufacturing (CAM) cutters /Machine presses etc... Each machine has a purchase date, and a record is also kept about its service history.

The machines are used to produce products which LSBU's sales team then sell on to commercial clients.

Within LSBU the spare parts it manufactures are referred to as products. Every product has an product number, description, manufacture date/time, manufacturing cost and base sales price... which is calculated as the (manufacturing cost + 45%)



Due to the very high market demand for its products for commercial vehicles, LSBU likes to keep each machine as busy as possible 24hours-per day, 7 days per week, working on the manufacture of its range of products.

CSI_5_BDD: Coursework CASE STUDY C

Coursework Mar 2023 – May 2023



Most of its machines are programmable and utilise Computer Aided Design - Computer Aided Manufacturing (CAD-CAM) interfaces to take product design instructions directly from Designer computer workstations and have the capability to manufacture the

products to the required specifications automatically, sometimes without human intervention.

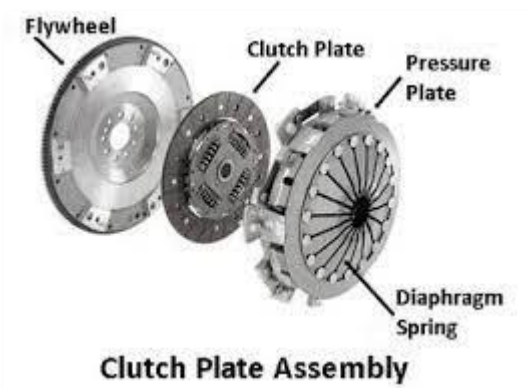
Other machines are manual i.e., they require an Operator (a skilled employee) who is responsible for manually operating the machine(s). Each operator belongs to a trade union and has specific qualifications certified technical skills associated with their job including, health and safety at work certifications which all operators must have renewed every 2 years.

Due to a system of working multiple shifts, several operators operate the same machine at different times of the day. All operators are routinely assigned to work



on only one machine and no operator is kept idle. A machine is never kept idle either, except when it is out for maintenance.

For each product that a machine produces the product is also given a unique serial number (this is in addition to the existing product id) so that products with the same id e.g., every flywheel is product id 500124, but each actual flywheel produced will also have a unique serial number e.g., 0001, 0002, 0003 etc...



Because of the busy work schedule and long running hours, a machine may be reported for maintenance numerous times. Regular maintenance is actually done on a machine every 72 hours.

If a machine is reported as being faulty then a special maintenance call can be issued once on a given day. Some machines are so new they may not have required any maintenance yet.

The products that are produced on the machines vary widely in nature (e.g., plates/ gears/ bearings/nuts/bolts/screws etc..). A product can be an assembly of several different component products (e.g., an engine or gearbox/clutch may have many products as its parts.) or a product can be a single piece.

Every product and component go through one or more machines for appropriate production processes. Likewise, several products may go through a particular machine for some standard safety testing process.



END OF CASE STUDY

CSI_5_BDD: Coursework CASE STUDY C

Coursework Mar 2023 – May 2023

MARKING SCHEME AND TASKS

Complete ALL tasks listed below. Every task must be accompanied by a brief narrative (max 1 side A4 per task) discussing the task production (your attempt success/failures)

	TASK	Mark	Weight	TOTAL
1	Subject Knowledge - Design Draw a complete Entity Relationship Diagram for the case study. Include all primary/foreign keys as part of your answer. (Consider & discuss carefully the attributes required to complete tasks 3 & 4 when you are choosing appropriate attributes)	10	1	10
2	Subject Knowledge - Design Produce complete Functional Dependency statements for the case study to prove that all of the attributes within your entities are in at least 3NF/BCNF (Consider & discuss carefully the attributes required to complete task 4 when you are choosing appropriate attributes).	10	1	10
3	Critical Analysis – Transforming design to implementation Using suitable relational database software (MS SQL Server) Set-up all tables, including your own, well-designed test data (minimum 20 records per table), to implement your design as a database. (Provide screenshots of all SQL creation statements including any T-SQL where appropriate, also the sample tables & data.)	10	1.5	15
4	Set-up and test all of the following queries using Structured Query Language – SQL (provide screenshots of all SQL including any T-SQL where appropriate for each task and the task output):			
a	Write a query to find the operators who have worked the highest and lowest number of shifts in the last month.	10	0.5	5
b	Write a query to find the average salary of all employees and displays employees. Who earn a salary that is 10% above or 10% below the average salary of all employees.	10	0.5	5
c	Write a query to produce a list of all machines that have been reported for maintenance issues on more than 3 occasions.	10	1	10
d	Write a procedure to demonstrate the business rule that an employees pay may not exceed their managers pay.	10	1	10
e	Write a procedure to provide a monthly report showing the total salary bill for each department. The output should include individual employee details for every company employee and a calculated total for each department. The procedure should be able to accept appropriate parameter values to enable dynamic search by week, month or quarter (3 months) Include appropriate attributes and totals in your report	10	1.5	15
5	Produce a dashboard combining 4-6 visualized elements, that can be used to tell an effective story about the business in your scenario. Use either Tableau or Power BI	10	1	10
6	Use MS Teams to record a video demo (10 mins max) of the tasks 4 and 5. During the video you must demonstrate your live execution of Task 4 in SQL Server and Task 5 in either Tableau or PowerBI. Include the URL to the video in your report. Ensure your BDD tutor has permissions to VIEW the video.	10	1	10
				100%

Remember ALL tasks including screenshots evidence in a SINGLE MS Word doc for submission.

Marking Criteria

This assignment will be marked using an adaptation of the University's new standardised marking criteria. It is important that you pay attention to the criteria that will be applied and address them in the text of your report.

Please note that the primary criterion being assessed in this assignment is your understanding of the material and your ability to analyse and reason about it. Submitting a working program is not sufficient to demonstrate this and will not in itself obtain a high grade.

Note that marks are awarded for the following main criteria:

1. Subject Knowledge - Design (20%)

Understanding and application of subject knowledge. Contribution to subject debate.

Mainly assessed by your written explanation of system design Tasks 1-2.

2. Critical Analysis- Transforming design to implementation (15%)

Assessed by the quality of the critical evaluation supporting the practical work for efficiently coding the construction of the database. There should be a critical and evaluative supporting narrative evaluating the technical choices behind the implementation of Task 3

3. Testing and Problem-Solving Skills – TSQL Queries (45%)

Design, implementation, testing and analysis of product/process/system/idea/solution(s) to the SQL query tasks.

Assessed based on the TSQL queries and stored procedures you develop and document. It is important to note that very little credit will be given to any code/examples you provide without explanation. Task 4 (A-E)

4. Practical Competence - Dashboard Design + Implementation (10%)

Skills to apply theory to practice or to test theory.

Apply theories of dashboard design in an implementation of a multi visualization dashboard using a connection to your database from either Tableau or SQL Server. It is important to note that very little credit will be given to any code/examples you provide without explanation Task5

5. Personal and Professional Development – Video Demo (10%)

Record a video of your learning and innovation through self-direction, planning and reflection. Focus on Tasks 4-5

Assessed on the basis of the quality of your 10 min Video Presentation of Tasks 4-5.

CSI_5_BDD: Coursework CASE STUDY C

Coursework Mar 2023 – May 2023

RUBRIC

Please note the criteria weightings and general interpretation shown in bold capitals under each criteria.

Criteria	Outstanding 100-80%	Excellent 79-70%	Very good 69-60%	Good 59-50%	Satisfactory 49-40%	Inadequate 39-30%	Very poor 29-0%
Subject Knowledge Understanding and application of subject knowledge/ application of appropriate techniques.. DESIGN SUBJECT KNOWLEDGE EXPLANATION 20%	Shows sustained breadth, accuracy and detail in understanding key aspects of subject. Contributes to subject debate. Awareness of ambiguities and limitations of knowledge.	Shows breadth, accuracy and detail in understanding key aspects of subject. Contributes to subject debate. Some awareness of ambiguities and limitations of knowledge.	Accurate and extensive understanding of key aspects of subject. Evidence of coherent knowledge.	Accurate understanding of key aspects of subject. Evidence of coherent knowledge.	Understanding of key aspects of subject. Some evidence of coherent knowledge.	Some evidence of superficial understanding of subject. Inaccuracies.	Little or no evidence of understanding of subject. Inaccuracies.
Critical Analysis Analysis and interpretation of design refinement. Structuring future proofing the model CRITIQUE DESIGN TRANSFER TO CODE 15%	Outstanding demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Excellent demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Very good demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Good demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Demonstration of critical analysis of the key possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Trivial demonstration of critical analysis of the possible design strategies that could be used to meet the software requirements, and evaluation of the approaches chosen.	Little or no critical analysis has been demonstrated.
Testing and Problem-Solving Skills Design, implementation, testing and analysis of product/process/system/idea/solution(s) to practical questions/problems IMPLEMENTATION OF SQL + PROCEDURES 45%	Outstanding implementation of all required software, with near perfectly organised, formatted and documented source code, and documented demonstration of runtime behaviour.	Excellent implementation of all required software, with well organised, formatted and documented source code provided	Competent implementation of all required software, with well organised, formatted and documented source code, and documented demonstration of runtime behaviour.	Implementation of all required software, with well organised, formatted and documented source code, and documented demonstration of runtime behaviour, with some missing/incorrect functionality or poor quality.	Implementation of most of the required software, with well organised, formatted and documented source code, and documented demonstration of runtime behaviour, with some missing/incorrect functionality or poor quality.	Implementation of only part of the required software, with well organised, formatted and documented source code, and documented demonstration of runtime behaviour, with some missing/incorrect functionality or poor quality.	Little or no functionality has been implemented.
Practical Competence Skills to apply theory to practice or to test theory USE OF DASHBOARD TOOLS 10%	Outstanding descriptions of factual information, programming techniques or theoretical explanations being found in technical or theoretical reference material.	Excellent explicit descriptions of all factual information, programming techniques or theoretical explanations that were found in technical or theoretical reference material.	Good explicit descriptions of all factual information, programming techniques or theoretical explanations that were found in technical or theoretical reference material.	Reasonable descriptions of most factual information, programming techniques or theoretical explanations that were found in technical or theoretical reference material.	Basic examples of the main factual information, programming techniques or theoretical explanations that were found in technical or theoretical reference material.	Some trivial examples of factual information, programming techniques or theoretical explanations being found in technical or theoretical reference material.	Little or no evidence of factual information, programming techniques or theoretical explanations being found in technical or theoretical reference material.
Personal and Professional Development Evidence Management of learning through self-direction, planning and reflection VIDEO DEMO 10%	Outstanding report organisation, structure, presentation, narrative voice and language.	Excellent report organisation, structure, presentation, narrative voice and language.	Very good report organisation, structure, presentation, narrative voice and language.	Good report organisation, structure, presentation, narrative voice and language.	Satisfactory report organisation, structure, presentation, narrative voice and language.	Poor report organisation, structure, presentation, narrative voice and language.	Report does not constitute a serious attempt at the assignment.