MODULE NAME:	MODULE CODE:
DATABASES	DBAS6211/d

ASSESSMENT TYPE: ASSIGNMENT 1 (PAPER ONLY)

TOTAL MARK ALLOCATION: 100 MARKS

TOTAL HOURS: 10 HOURS

By submitting this assignment, you acknowledge that you have read and understood all the rules as per the terms in the registration contract, in particular the assignment and assessment rules in The IIE Assessment Strategy and Policy (IIE009), the intellectual integrity and plagiarism rules in the Intellectual Integrity and Property Rights Policy (IIE023), as well as any rules and regulations published in the student portal.

INSTRUCTIONS:

1. ***No material may be copied from original sources, even if referenced correctly, unless it is a direct quote indicated with quotation marks. No more than 10% of the assignment may consist of direct quotes.***
2. ***Your assignment must be submitted through SafeAssign.***
3. ***Save a copy of your assignment before submitting it.***
4. *Assignments must be typed unless otherwise specified.*
5. *All work must be adequately and correctly referenced.*
6. *This is an individual assignment.*

ACADEMIC HONESTY DECLARATION

Please complete the Academic Honesty Declaration below.
Please note that your assessment will not be marked, and you will receive 0% if you have not completed ALL aspects of this declaration.

Declaration

	SIGN
I have read the assessment rules provided in this declaration.	
This assessment is my own work.	
I have not copied any other student's work in this assessment.	
I have not uploaded the assessment question to any website or App offering assessment assistance.	
I have not downloaded my assessment response from a website.	
I have not used any AI tool without reviewing, re-writing, and re-working this information, and referencing any AI tools in my work.	
I have not shared this assessment with any other student.	
I have not presented the work of published sources as my own work.	
I have correctly cited all my sources of information.	
My referencing is technically correct, consistent, and congruent.	
I have acted in an academically honest way in this assessment.	

Referencing Rubric

Providing evidence based on valid and referenced academic sources is a fundamental educational principle and the cornerstone of high-quality academic work. Hence, The IIE considers it essential to develop the referencing skills of our students in our commitment to achieve high academic standards. Part of achieving these high standards is referencing in a way that is consistent, technically correct and congruent. This is not plagiarism, which is handled differently.

Poor quality formatting in your referencing will result in a penalty **of** according to the following guidelines **a maximum of ten percent being deducted from the overall percentage**. Please note, however, that **evidence of plagiarism in the form of copied or uncited work (not referenced), absent reference lists, or exceptionally poor referencing, may result in action being taken in accordance with The IIE's Intellectual Integrity Policy (0023)**.

Markers are required to provide feedback to students by indicating **(circling/underlining) the information that best describes the student's work.**

Minor technical referencing errors: 5% deduction from the overall percentage. – the student's work contains **five or more errors** listed in the minor errors column in the table below.

Major technical referencing errors: 10% deduction from the overall percentage. – the student's work contains **five or more errors** listed in the major errors column in the table below**.**

If both minor and major errors are indicated, **then 10% only** (and not 5% or 15%) is deducted from the overall percentage. The examples provided below are not exhaustive but are provided to illustrate the error.

Required: **Technically correct referencing style**	**Minor errors in technical correctness of referencing style** **Deduct 5% from overall percentage.** **Example: if the response receives 70%, deduct 5%. The final mark is 65%.**	**Major errors in technical correctness of referencing style** **Deduct 10% from the overall percentage.** **Example: if the response receives 70%, deduct 10%. The final mark is 60%.**
Consistency • The same referencing format has been used for all in-text references and in the bibliography/reference list.	**Minor inconsistencies.** • The referencing style is generally consistent, but there are one or two changes in the format of in-text referencing and/or in the bibliography. • For example, page numbers for direct quotes (in-text) have been provided for one source, but not in another instance. Two book chapters (bibliography) have been referenced in the bibliography in two different formats.	**Major inconsistencies.** • Poor and inconsistent referencing style used in-text and/or in the bibliography/ reference list. • Multiple formats for the same type of referencing have been used. • For example, the format for direct quotes (in-text) and/or book chapters (bibliography/ reference list) is different across multiple instances.
Technical correctness • Referencing format is technically correct throughout the submission. • The correct referencing format for the **discipline** has been used, i.e., either **APA,** OR **Harvard** OR **Law** • Position of the reference: a reference is directly associated with every concept or idea. • For example, quotation marks, page numbers, years, etc. are applied correctly, sources in the bibliography/reference list are correctly presented.	**Generally, technically correct with some minor errors.** • The correct referencing format has been consistently used, but there are one or two errors. • Concepts and ideas are typically referenced, but a reference is missing from one small section of the work. • Position of the references: references are only given at the beginning or end of every paragraph. • For example, the student has incorrectly presented direct quotes (in-text) and/or book chapters (bibliography/reference list).	**Technically incorrect.** • The referencing format is incorrect. • Concepts and ideas are typically referenced, but a reference is missing from small sections of the work. • Position of the references: references are only given at the beginning or end of large sections of work. • For example, incorrect author information is provided, no year of publication is provided, quotation marks and/or page numbers for direct quotes missing, page numbers are provided for paraphrased material, the incorrect punctuation is used (in-text); the bibliography/reference list is not in alphabetical order, the incorrect format for a book chapter/journal article is used, information is missing e.g. no place of publication had been provided (bibliography); repeated sources on the reference list.
Congruence between in-text referencing and bibliography/ reference list • All sources are accurately reflected and are all accurately included in the bibliography/ reference list.	**Generally, congruence between the in-text referencing and the bibliography/ reference list with one or two errors.** • There is largely a match between the sources presented in-text and the bibliography. • For example, a source appears in the text, but not in the bibliography/ reference list or vice versa.	**A lack of congruence between the in-text referencing and the bibliography.** • No relationship/several incongruencies between the in-text referencing and the bibliography/reference list. • For example, sources are included in-text, but not in the bibliography and vice versa, a link, rather than the actual reference is provided in the bibliography.
In summary: the recording of references is accurate and complete.	In summary, at least **80%** of the sources are correctly reflected and included in a reference list.	In summary, at least **60%** of the sources are incorrectly reflected and/or not included in reference list.

Overall Feedback about the consistency, technical correctness and congruence between in-text referencing and bibliography:

Background

Thato has always been interested in learning different things about the world. Besides his studies at college to become an environmental lawyer, he has done various short courses on multiple platforms. He started with a massive open online course (MOOC) on astronomy presented by a well-known university in the United States of America. He decided not to opt for the official certificate, so the study did not cost anything. However, it was still quite academic and not what he hoped to do for fun. So, his search continued.

Then he found an international course marketplace, where the instructors posted their courses online, and anybody could enrol to watch the video material at any time. He has since learned how to paint watercolour flowers from an artist in Spain. Additionally, he learned how to repair broken ceramics from a wonderfully creative person in Japan and even how to create animated characters from somebody in Italy. These online courses cost him less than a good dinner since he patiently awaited special offers.

After a while, he started wondering what he could learn from South African people. We have such talented creative people. Indeed, there must be great content out there. However, he could not find what he was looking for. Plenty of serious, academic short courses are usually available, with equally high prices too. There just was not a space for creatives to post their material.

Thato wanted to fill this gap with our South African course marketplace website.

It would help if you answered all the questions within the context of this scenario. Apply your knowledge – do not just present the textbook facts.

Question 1 – Database Management Systems (Marks: 20)

Thato has started to think about what he will need to set up his course marketplace website. He has realised that there will be quite a lot of data that needs to be stored.

Make an infographic explaining what a database management system (DBMS) is and why it would be helpful for Thato to have one. Include the five components of a DBMS. Include a description of each component and an example relevant to Thato's course marketplace.

You may use any tool of your choice to create the infographic, as long as you can embed it in the document you submit for the assignment. Make sure that the text is readable in the final document.

Marks will be awarded as follows:

Description of a DBMS	2 marks
List of the components	5 marks
Relevant examples of the components	10 marks
Overall appearance of the infographic	3 marks
Total	**20 marks**

Question 2 – Types of Databases (Marks: 10)

After carefully studying the infographic, Thato is now convinced that a database is necessary. But now, he must choose whether to use a relational or NoSQL database.

Explain to him which type of database (relational or NoSQL) you would recommend and why for each of the following types of data.

Q.2.1	Data about courses, for example, the name of the course, name of the creator, category that the course belongs to, etc.	(5)
Q.2.2	Videos, pictures, and files the course creators want to make available to those purchasing their courses.	(5)

Question 3 – Entity Relationship Diagrams (Marks: 50)

Thato has given what data he needs for the course marketplace website a lot of thought. He has come up with quite a comprehensive set of business rules.

Course Marketplace Business Rules

1. Each course can belong to exactly one category, and many courses can belong to the same category.
2. The name of each category must be stored in the database.
3. The name, description, price, listing date and last updated date must be stored in the database for each course.
4. A teacher can create many courses, and each course can be created by more than one teacher.
5. The percentage that each teacher contributes to a specific course must be stored in the database.
6. The following must be stored for each teacher: name, surname, email, bank, bank account, bio, and website.
7. Each teacher can indicate that they specialise in multiple categories. And many teachers can specialise in the same category.
8. A discount can be applied to a specific course. The same course can be discounted many different times or never.
9. The from date and to date, as well as the price during the discount, needs to be stored in the database.
10. Sometimes courses are sold as part of a bundle. Many courses can be part of the same bundle, and the same course can be part of many different bundles.
11. The percentage contribution of each course to a specific bundle needs to be stored in the database.
12. The name, start date, end date and price of each bundle must be stored in the database.
13. A participant can (hopefully will!) buy many courses over time. And many participants can buy the same course.
14. The date that a participant signs up for a course must be stored in the database.
15. If a discount is active when a course is bought, the fact that a discount was applied to the purchase needs to be recorded in the database.
16. The following data must be stored for each participant: name, surname, email, bio, and website.
17. Each participant can indicate that they are interested in multiple categories, and many participants can be interested in the same category.

Draw an Entity Relationship Diagram (ERD) using Unified Modelling Language (UML) notation, representing these business rules. Your design should be at the logical level – include surrogate primary key and foreign key fields. Remember to remove any many-to-many relationships.

You only need to submit the final, complete diagram.

Tip: Make sure the diagram is readable in the document you submit!

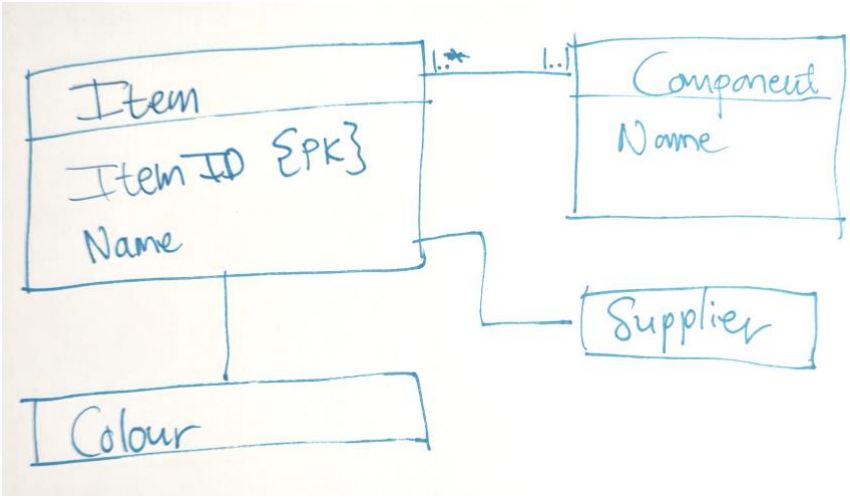
Marks will be allocated as follows:

Entities	11 marks
Relationships with names	13 marks
Multiplicities	13 marks
Primary keys	5 marks
Foreign keys	5 marks
Other attributes	2 marks
Correct UML notation	1 mark
Total	**50 marks**

Question 4 – Entity Relationship Diagram Review (Marks: 20)

Thato, being ever curious and wanting to learn more about anything and everything, decided to try his hand at creating a UML ERD for a relational database too. You made it look so easy after all, so he was confident he could do it too. So, he wrote some new rules about a fictional manufacturing company and created the below ERD based on some web pages he consulted.

- Each product requires different components during the manufacturing process. A component can be used in multiple different products.
- The quantity of each component that is used for a specific product must be stored in the database.
- The name of each product and each component must be stored in the database.
- Each component is bought from a specific supplier, and a supplier can supply many different components.
- The name and address of each supplier must be stored in the database.
- Each production line manufactures exactly one type of product at a time.
- A colour is allocated to each production line to make them easy to distinguish.



Comment on his diagram, explaining which 10 changes you recommend to improve the diagram to align with the business rules. Explain why you would make each change too, so he can learn from his mistakes. Also, include improvements that would make it possible to implement the design in a relational database.

Hint: Include the diagram and add letters to the diagram that you can refer to in your comments.

[TOTAL MARKS: 100]