THE INDEPENDENT INSTITUTE OF EDUCATION

MODULE NAME:	MODULE CODE:
DATABASE (INTRODUCTION)	DATA6211
DATABASE (INTRODUCTION)	DATA6211d
DATABASE (INTRODUCTION)	DATA6211p

ASSESSMENT TYPE:	EXAMINATION (PAPER ONLY)
TOTAL MARK ALLOCATION:	120 MARKS
TOTAL HOURS:	3 HOURS (+15 minutes reading time)

INSTRUCTIONS:
1. Please adhere to all instructions in the assessment booklet.
2. Independent work is required.
3. Five minutes per hour of the assessment to a maximum of 15 minutes is dedicated to reading time before the start of the assessment. You may make notes on your question paper, but not in your answer sheet. Calculators may not be used during reading time.
4. You may not leave the assessment venue during reading time, or during the first hour or during the last 15 minutes of the assessment.
5. Ensure that your name is on all pieces of paper or books that you will be submitting. Submit all the pages of this assessment's question paper as well as your answer script.
6. Answer all the questions on the answer sheets or in answer booklets provided. The phrase 'END OF PAPER' will appear after the final set question of this assessment.
7. Remember to work at a steady pace so that you are able to complete the assessment within the allocated time. Use the mark allocation as a guideline as to how much time to spend on each section.

Additional instructions:
1. *This is a CLOSED BOOK assessment.*
2. *Calculators are allowed*
3. *Answer All Questions.*

Question 1		(Marks: 10)
Data must be fit for purpose and can be used to develop new strategies which are aimed at increasing the profitability of an organisation. Hence, data quality and governance are critical sources to a good decision-making process.		
Q.1.1	Differentiate between data governance and data quality.	(4)
Q.2.2	Summarise any three levels through which data quality can be examined.	(6)

Question 2		(Marks: 20)
Q.2.1	Discuss what "business rules" are and give three reasons why they are essential to database design.	(10)
Q.2.2	Provide two business rules examples that show the following relationship types: (a) one-to-one relationship; and (b) one-to-many relationship.	(5)
Q.2.3	Briefly discuss the importance of software independence and its potential benefits to the future of database design.	(5)

Question 3		(Marks: 40)
Q.3.1	Discuss why data models are important in database modelling.	(10)
Q.3.2	Create an Entity Relationship Diagram (ERD) using UML notation after studying the business rules below. Make sure to include the entities, at least three attributes per entity, relationships and multiplicities. • A student may register for many subjects and a subject is registered by many students. A student's number, name and age needs to be stored in the database.	(30)

- Each subject's code, name, duration, cost and start date needs to be stored in the database.

- A lecturer may lecture many subjects. However a subject can only be lectured by one lecturer. Each lecturer's code, name and qualification need to be stored.

- A registration needs to have the following data stored: registration number and registration date.

- Parents provide payment for each registration. A parent may pay for many registrations, but a registration can only be paid by one parent. Each parent's ID, name and cell phone needs to be stored.

- A registration must always belong to a student and a course must always be part of a registration.

- A lecturer must lecture at least one subject and a subject needs to be lectured by at least one lecturer.

- A parent needs to provide payment for at least one registration and a registration needs to be paid by at least one parent.

Mark Allocation:

Entities	5 marks
Attributes (at least three per entity)	10 marks
Multiplicities	5 marks
Composite entity	1 mark
Primary keys	2 marks
Relationship names	5 marks
UML notation	2 marks

Question 4 (Marks: 25)

The table below is currently normalized to 1NF

COURSE_CODE	COURSE_NAME	LECTURER_ID	LECTURER_NAME	SUBJECT_CODE	SUBJECT_NAME	SEMESTER_DATE	HOURS
COSC303	COMPUTER SCIENCE	L_0108	SAMUEL JONES	NETW101	NETWORKS	01/01/2010	50
COSC303	COMPUTER SCIENCE	L_0124	JULIA CORTEZ	PROG202	PROGRAMMING ADV	01/01/2010	60
COSC303	COMPUTER SCIENCE	L_0140	MARK HARRIS	DATA202	DATABASE ADV	01/01/2010	60
FIAC303	FINANCIAL ACCOUNTING	L_0110	ANNA HARRIS	ACCO101	ACCOUNTING	01/07/2010	40
FIAC303	FINANCIAL ACCOUNTING	L_0140	MARK HARRIS	DATA202	DATABASE ADV	01/01/2011	60
FIAC303	FINANCIAL ACCOUNTING	L_0105	PALESA NGOMANE	FINA202	FINANCE ADV	01/07/2010	60

You are required to normalise to the following forms:

Q.4.1	2NF	(10)
Q.4.2	3NF	(15)

Question 5   **(Marks: 25)**

This question must NOT be done in the practical room/computer lab. You are required to write the code in your answer book.

SQL is a programming language used by database developers to query data. You are required to write the SQL code when answering the following questions.

Student table

Student#	First_Name	Last_Name	Phy_Address	City	Age	Email_Address
200126511	Mary	Grimes	10 Charles St	PTA	21	200126511@rosebank.co.za
213011223	Linda	Hlagala	12 Flower St	PTA	22	213011223@rosebank.co.za
202126511	Janie	McCain	22 Madiba Ave	JHB	19	202126511@varsitycollege.co.za
201011223	Tshepo	Ross	343 Lilian Ngoyi St	JHB	18	201011223@varsitycollege.co.za

Results table

Student#	Subject	Grade_Status
200126511	English	Pass
213011223	Maths	Distinction
202126511	Accounting	Pass
201011223	Accounting	Fail
213011223	Science	Pass

Subject table

Subject	Subject_Cost
English	2100
Maths	2300
Accounting	1980
Science	2150

Q.5.1	Show how you will create a results table using the SQL statement.	(5)
Q.5.2	Write a SQL statement that will show all columns in the results table. Sort the data by 'Student#' in descending order.	(2)
Q.5.3	Write a SQL statement that shows all subjects that costs between 2300 and 2500.	(3)

Q.5.4	Write a SQL statement to add a column named "Address" in the student table.	(2)
Q.5.5	Write a SQL statements to count how many subjects are appearing in the subject table?	(2)
Q.5.6	Write a SQL statement that will show student#, first_name, last_name and age with emails addresses that end with the email domain "@rosebank.co.za".	(3)
Q.5.7	Write a SQL statement to add a new record into results table with the following details. **201011224, Accounting, Pass**	(3)
Q.5.8	Write a SQL statement that will display the youngest student. In your query, display the following fields, Student#, First_Name, Last_Name and Age.	(3)
Q.5.9	Write a SQL statement that determines the average subject cost of all the subjects in the subject table.	(2)

END OF PAPER