*"Investing in Africa's Future"*

**COLLEGE OF ENGINEERING AND APPLIED SCIENCES**

**NCIS301 DATABASE SYSTEMS**

**END OF SEMESTER EXAMINATIONS**

**NOVEMBER 2025**

**LECTURER: MR J. CHINZVENDE**

**TIME: 3 HOURS**

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## INSTRUCTIONS

Answer **ALL** Questions

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Start **each** question on a new page.

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The marks allocated to **each** question are shown at the end of the section.

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**Create a folder on your desktop and put your student number as the name of the folder (for example 240708)**
Credit will be awarded for logical, systematic and neat presentations.

**Question One [50]**

**A.** Design a student's database using the following information　　　　　　　　　[20]

**STUDENT**

| Field | DataType | Field |
|---|---|---|
| StudentID | nvarchar(10) | 10 |
| StudentName | nvarchar(20) | 20 |
| DateOfBirth | Date/time | |

**COURSE**

| Field | DataType | Field |
|---|---|---|
| CourseCode | nvarchar(10) | 10 |
| CourseTitle | nvarchar(20) | 20 |
| CreditHours | Number | |

**ASSESMENT**

| Field | DataType | Field |
|---|---|---|
| AssesmentID | autonumber | |
| StudentID | nvarchar(10) | 10 |
| CourseCode | nvarchar(10) | 10 |
| Mark | Number | |
| Grade | nvarchar(3) | 3 |

**B.** Enter the following data into the respective tables　　　　　　　　　[10]

Enter the following records into the **STUDENT** table

| StudentID | StudentName | Gender | DateOfBirth |
|---|---|---|---|
| 240200 | Bernard | Male | 15/06/2001 |
| 240201 | Blessing | Male | 16/03/1990 |
| 240202 | Brian | Male | 20/12/1995 |
| 240203 | Deborah | Female | 17/09/2005 |
| 240204 | Chipo | Female | 22/05/2009 |
| 240300 | Kuda | Male | 31/01/1995 |

Enter the following records into the **COURSE** table

| Course Code | Course Title | Credit Hours |
|---|---|---|
| NHIT100 | Information Systems | 2 |
| NAAE202 | Hydrology and Water Resources | 3 |
| NAAE303 | Hydraulics | 2 |
| NAAE304 | Soil Water Relations and Soil Physics | 3 |
| NAAE205 | Economics and Socio-Economics | 3 |
| NAAE206 | Irrigation Agronomy | 2 |

Enter the following records into the **ASSESSMENT** table

| AID | StudentID | CourseCode | Mark | Grade |
|---|---|---|---|---|
| 001 | 240200 | NHIT100 | 82 | A |
| 002 | 240200 | NAAE202 | 70 | B |
| 003 | 240201 | NAAE202 | 47 | D |
| 004 | 240203 | NAAE303 | 51 | C |
| 005 | 240300 | NHIT100 | 85 | A |

**C.** Design query to perform the following operations
a. **Add** a new student named "Alice " whose DOB is 15/12/2006, female and student ID is 240301 to the student table
b. Find the total number of Males in the Student table
c. Get all students older than 18 years
d. list each student's ID, name, DOB alongside the course title they are enrolled in.
e. change the credit value of the course "Information Systems" course to 4
f. Remove a student with the ID 240300 from the database
g. Add a new record for "Alice " who scored 85 in the Information Systems course
h. Calculate the average score for the courses
i. Increase all scores in the 'Hydrology and Water Resources' course by 5 marks
j. Get all students with Marks less than 50 including their personal and Course details

[20]

**Save the files in your folder at desktop as Question One**

      I.     SQL scripts (in .sql files or included in the document).

     II.     The report with explanations and query results.

    III.     Backup of the database as **Student.bak** file

Question Two [**50 marks**]

Using SQL Server 2014 or higher version, you are tasked with creating a database for a small library system. The library needs to manage information about books, authors, members, and loans.

**Requirements**

1. **Database Design**

Create an ER (Entity-Relationship) diagram for the library system. The diagram should include the following entities:

a. **Book**: Attributes include BookID (PK), Title, Genre, PublishYear, AuthorID (FK).

b. **Author**: Attributes include AuthorID (PK), Name, BirthYear.

c. **Member**: Attributes include MemberID (PK), Name, JoinDate, Email.

d. **Loan**: Attributes include LoanID (PK), BookID (FK), MemberID (FK), LoanDate, ReturnDate. [**10**]


2. **Database Implementation**

   a. Create the database and the necessary tables based on your ER diagram using SQL.

   b. Ensure that you define primary and foreign keys correctly.

   c. Insert at least 5 records for each entity (Book, Author, Member, Loan). [**10**]


3. **SQL Queries**


   a. Write and execute the following SQL queries:

   b. Retrieve all books along with their authors.

   c. List all members who have borrowed books.

   d. Find the number of books available in each genre.

   e. Retrieve all loans that are overdue (i.e., Return Date is NULL and Loan Date is more than 30 days ago). [**10**]

4. **Data Integrity**

   a. Implement constraints (e.g., NOT NULL, UNIQUE) where applicable to ensure data integrity.

   b. Write a brief explanation (150-200 words) of how you ensured data integrity in your database. **[10]**

5. **Documentation**

   a. Provide a report that includes:

      1. Your ER diagram.

      2. The SQL scripts used to create tables and insert data.

      3. The SQL queries you executed with their results.

      4. Explanation of data integrity measures taken. **[05]**

6. **Submission Guidelines**

   Save your work in your folder at the desktop as a single PDF document or a zip file containing:

   a. ER diagram (in image or PDF format).

   b. SQL scripts (in .sql files or included in the document).

   c. The report with explanations and query results.

   d. Database backup as Library.bak file

   • Ensure proper formatting and clarity in your documentation.

Save in your folder on the desktop **[05]**