"Investing in Africa's Future"

COLLEGE OF ENGINEERING AND APPLIED SCIENCES (CEAS)

CSC 1102: PRINCIPLES OF PROGRAMMING LANGUAGES

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2025

LECTURER: MS ELIZABETH MAFU

TIME: 3 HOURS

INSTRUCTIONS

1. This paper consists of **7 questions**.

2. Attempt **any FIVE (5)** questions. Each question carries **20 marks**.

3. Use **clear explanations and well-commented Python code** in your answers.

4. If assumptions are made, clearly state them.

5. Provide both the word document and python files in one document

Question 1.
Write a Python program that simulates a simple **banking system** with the following features:

- Create a class BankAccount with attributes: account number, account holder name, and balance.

- Implement methods for **deposit**, **withdrawal**, and **checking balance**.

- Demonstrate the program by creating at least **two accounts** and performing transactions. *(20 marks)*

Question 2.
Design a Python program that manages a **student record system** with the following:

- Use a **list of dictionaries** to store multiple students' details (name, student ID, programme, Grade Point Average (GPA)).

- Add functions to:

  o Add a new student

  o Search for a student by ID

  o Display all students

- Demonstrate your program with at least **three student records**. *(20 marks)*

Question 3.
Write a Python program that reads from a **text file** containing employee data (name, department, salary). Your program should:

- Read all records from the file

- Display them in a formatted table

- Calculate and display the **average salary**

- Identify and display the employee with the **highest salary** *(20 marks)*

Question 4.
Python supports **Object-Oriented Programming (OOP)**.

- Define a class Book with attributes title, author, and price.

- Add a method to apply a **discount** to the price.

- Create a subclass EBook that includes an additional attribute file_size.

- Demonstrate the use of inheritance by creating both Book and EBook objects and applying discounts. *(20 marks)*

Question 5.
Write a Python program that uses **functions** to:

- Accept a list of integers from the user

- Return the **sum of even numbers** and the **sum of odd numbers** separately

- Find and return the **maximum and minimum** values in the list

- Ensure proper **exception handling** if the input is invalid   *(20 marks)*

Question 6.
Python supports **functional programming concepts**.

- Write a program using **map(), filter(), and lambda** functions to:

    i.   Double all numbers in a list

    ii. Extract only even numbers from the list

    iii. Calculate the square of each odd number

- Demonstrate your program with at least **10 numbers**.   *(20 marks)*

Question 7.
Design a **mini Python project** to implement a **Library Management System** with the following:

- Use classes to represent books and members

- Allow adding new books and registering new members

- Allow members to borrow and return books

- Keep track of borrowed books and available stock

- Display the list of all books and their availability   *(20 marks)*

END OF EXAMINATION