New Cairo Technological University
Faculty of Industry and Energy Technology
Information & Communication Technology Program

جامعة القاهرة الجديدة التكنولوجية NCT NEW CAIRO TECHNOLOGICAL UNIVERSITY

Sub.	Re-Sub
√	

LOs	LO3		LO4	
Sub				
Resub	P	Not Achieved	P	Not Achieved

Student Name		Code		Section	
Unit No. & Title	ICT 121		Programming Essentials in C		
Qualification	Higher Diploma in Information Technology (y1-2nd semester)				
Assignment No.	2		Assessor Name	Dr. Ayat Taha	
Evidence	Document		IV Name	Dr. Rasha Elstohy	
Hand out date	26/4/2025		Hand in date	3/5/2025	

Targeted LO	Targeted criteria	Criteria achieved	Assessment comments
LO3	Pass		
	Merit		
	Distinction		
LO4	Pass		
	Merit		
	Distinction		
Assessor Signature:	Ayat Taha		

Criteria reference	Targeted criteria	To achieve the criteria the evidence must show that the student is able to:	Evidence	Page numbers
LO3: Implement C programs using functions, pointers, arrays, and structures to solve programming problems.	Pass	**P7**: Declare and use arrays to store and process data. **P8**: Define and use structures to group related data in a program. **P9**: Create and use functions with parameters and return values to organize code. **P10**: Use pointers to access and manipulate variables.	Document & Practical	
	Merit	**M5**: Compare and contrast arrays and structures, explaining their respective uses and advantages in C programming. **M6**: Demonstrate the use of pointers with arrays and structures to improve program flexibility and memory access.		
	Distinction	**D3**: Design and implement a sophisticated C program that integrates multiple concepts (functions, pointers, arrays, structures) to solve a complex real-world problem, ensuring efficiency and scalability.		
LO4: Apply file handling techniques in C to manage external data efficiently.	Pass	**P11**: Use file handling functions to read from and write to files in C. **P12**: Demonstrate the use of file modes in file operations.		
	Merit	**M7**: Implement basic file operations (open, read, write, and close) to manage text-based files		
	Distinction	**D4**: Design and build a C application that uses file handling to simulate a real-world system.		

"I certify that this assignment is my own work, written in my own words. Any other person's work included in my assignment is referenced / acknowledged".

IV Signature: Rasha Elstohy	Learner's signature:	Date:

Scenario

You are a **C programmer** working at **BrightFuture Software Solutions**, a company that specializes in educational software development. Your team has been assigned a project by **Modern International School** to develop a **Student Grading System** that helps teachers manage student academic records, compute grades, and generate performance reports efficiently.

As a developer, **you are responsible** for implementing the core logic of the system using **C programming**. The system must handle storing data in memory, performing calculations, and saving/loading student records from external files.

Task No.01

1. Write a C program that stores the marks of 5 students in 3 subjects using a 2D array. Then, calculate and display the total marks for each student. P7

2. Create a structure named `Student` that stores student ID, name, and three subject marks. Then, write a program to input and display data for 3 students. P8

3. Write a function named `calculateAverage()` that takes a student structure as input, calculates the average of marks, and updates the structure. P9

4. Develop a C program that declares an integer variable for a student's ID. P10
   Then, use pointers to:
   a. Change the value of the student ID.
   b. Display the updated values both directly and through the pointers.

5. Compare between arrays and structures in C. When is it better to use a structure instead of arrays? Give an example. M5

6. Enhance the Student Grading System by implementing a feature that allows dynamic access and modification of student marks using pointers. M6

   a. Store the marks of 5 students in a one-dimensional array.
   b. Utilize a pointer to traverse the array and display each student's marks.

7. Create a complete student grading system using: D3
    a. Arrays to store marks
    b. Structures for student info
    c. Functions to calculate average
    d. Pointers to update student data

    The program should take input for students, calculate average marks, and display a full report

Task No.02

8. Write a program that saves student names and their averages to a file named `grades.txt`. P11
9. Explain and demonstrate the difference between `"w"` and `"a"` modes when writing files in C. p12
10. Modify your program to: M7

    a. Open a file in `"r"` mode
    b. Read student records
    c. Display them in a report format

11. Design a complete grading application that: D4

    a. Loads student data from a file
    b. Allows the user to update marks
    c. Recalculates averages
    d. Saves the updated data back to the file

Resubmission Feedback: *Please note resubmission feedback is focussed only on the resubmitted work	
Assessor Signature: Ayat Taha	**Date:** 24 / 4/2025
Internal Verifier's Comments:	
IV Signature: Rasha Elstohy	**Date:** 27 /4 /2025