



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Mechatronics Engineering

Subject Code : DI04020031

Subject Name : Basics of C Programming

w. e. f. Academic Year:	2025-26
Semester:	4 th
Category of the Course:	Professional Elective - II

Prerequisite:-	Basic knowledge of digital logic and arithmetic maths.
Rationale:	The present era can be said a digital era. Nowadays almost in every walk of life there is application of digitization, atomization as well as connecting various gadgets, home appliances, human body etc. to each other. The core component which drives these tasks is a piece of code for the machine, known as a program. It is essential for the students to learn basic concepts and methodology to develop computer programs. This Course intends to develop programming skills in the students, using a popular structured programming language 'C'. The students will learn step by step procedure (i.e. flowcharting & Algorithm) of any program development process. The programming skills thus acquired using 'C' language can be used for acquiring necessary programming skill to work with advance level programming languages which in turn will be helping in developing programs for the scientific, research and business purposes.

2. Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes (CO's)	RBT Level
01	Design algorithm and flowchart for the given Problem.	R/U/A
02	Develop adequate knowledge for programming languages and problem solving techniques.	R/U/A
03	Interpret the basic principles of C Programming and to familiarize with basic syntax and semantics of C language.	R/U/A
04	Construct C programs using control structures.	R/U/A
05	Demonstrate derived data type in C language using Array & String.	R/U/A



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3. Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE(E)	PA(M)	PA(I)	ESE (V)	
03	00	02	04	70	30	20	30	150

4. Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Flowchart and Algorithm	07	15
2.	Basics of 'C' and it's Operators	11	30
3.	Decision Statements	10	20
4.	Loop Control Statements	10	20
5.	Array in C programming	07	15
	Total	45	100

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

6. COURSE DETAILS:-

Unit	Major Learning Outcomes(Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit I Flowchart and Algorithm	(a)Draw flow chart to solve given problem logically. (b)Develop Algorithm to solve given program.	1.1 Flowchart - Definition and Importance of flowchart. - Symbols of Flowchart. - Develop flowcharts 1.2 Algorithm Developing and writing algorithm using pseudocodes



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Unit II Basics of 'C' and its Operators	(a) Comprehend general structure of 'C' program. Write and execute simple program in 'C'. (b) Declare and define variables (c) Use arithmetic, relational and logical operators for forming expressions.	2.1 General structure of 'C' program and standard directories 2.2 Character set, 'C' tokens 2.3 Keywords and Identifiers, C Constants 2.4 Variables, Rules for defining variables, declaration and Initialization of variables 2.5 Write, compile, execute a simple 'C' Program 2.6 Arithmetic operators 2.7 Relational operators 2.8 Assignment operators 2.9 Logical operators 2.10 Increment & Decrement operator
Unit III Decision Statements	(a) Develop programs using decision making statements in 'C' language.	3.1 If statement 3.2 If-else statement 3.3 Nested If-else statement 3.4 If-else-if Ladder statement 3.5 switch statements 3.6 goto statement
Unit IV Loop Control Statements	(a) Develop programs using Structured loop control statements in 'C' Language.	4.1 For loop 4.2 Nested for loop 4.3 While loop 4.4 Do-while loop
Unit V Array in C programming	(a) Declare and define array. (b) Develop programs using array in 'C' language.	5.1 Introduction to Array 5.2 Array Declaration 5.3 Array initialization 5.4 programs based on array

7. SUGGESTED PRACTICAL EXERCISES:-

The following practical outcomes (PrOs) are the sub-components of the COs. Some of the PrOs marked '*' are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.



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Sr. No.	Practical Outcomes (PrOs)	Approx. Hrs. required
1.	Draw Flow Chart to find (1) Maximum of two numbers (2) Minimum of two numbers	04*
2.	Write algorithm for finding (1) Maximum of two numbers (2) Minimum of two numbers	04*
3.	Write a program to print (1) "Hello world" (2) your Enrollment number	04*
4.	Write a program to add, multiply and divide two numbers entered by user.	04*
5.	Write a program to find (1) Maximum of two numbers (2) Minimum of two numbers.	02*
6.	Write a program to find grade of student using switch statement.	02*
7.	Write a program to print 1 to 10 number using for loop	02*
8.	Write a program to print 1 to 10 number using while loop	02*
9.	Write a program to find maximum number from given array	02*
10.	Write a program to find minimum number from given array	02*
	Total (Hours)	28

NOTES:-

I. More Practical Exercises can be designed and offered by the concerned course teacher to develop the industry-relevant skills/outcomes to match the COs. The above table is only a representative list.

II. It is compulsory to prepare log book/continuous records of exercises. It is also required to get each exercise recorded in log book/continuous records, checked and duly dated signed by teacher. CA component of practical marks is dependent on continuous and timely evaluation of exercises.

III. Term work report must not include any photocopy/ies, printed manual/pages, litho, etc. It must be hand written / hand drawn by student only.

a. Brief details of industry visited.

b. Type, location, products, rough layout, human resource, etc., of industry.

c. Details, description and broad specifications of machineries/processes observed.

d. Safety norms and precautions observed.



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e. Student's own observation on industrial environment, productivity concepts, quality consciousness and quality standards, cost effectiveness, culture and attitude.

f. Any other details/ observations asked by accompanying faculty.

IV. For practical ESE part, students are to be assessed for competencies achieved. They should be assigned the necessary data and should be given any one experience to perform. The following are some sample 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above-listed Practical Exercises of this course required, which are embedded in the COs and, ultimately, the competency.

➤ SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

Programmable logic Controllers being a most important subject of Mechatronics, teachers are expected to lay considerable stress on understanding the basic concepts, principles, and applications. For this purpose, teachers are expected to give simple problems in the classroom and provide tutorial exercises to develop the necessary knowledge for comprehending the basic concepts and principles. As far as possible, teaching the subject is supplemented by demonstrations and practical work in the laboratory using various PLC Simulation Software's.

8. References/Suggested Learning Resources:

(a) Books:

Sr. No	Title of Book	Author	Publication
1.	Kamthane Ashok N.	Programming with ANSI And Turbo C	Pearson publication, Latest Edition
2.	Balaguruswami E.	Programming in ANSI C	Tata McGraw-Hills publication, Latest Edition
3.	Kanetkar Yashavant	Let us 'C'	BPB publications, Latest Edition

(b) Open source software and website:

- 1) <https://www.programiz.com/c-programming/online-compiler>
- 2) <https://c.codeutility.io>



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9. MAJOR EQUIPMENT / INSTRUMENTS AND SOFTWARE REQUIRED

Sr. No.	Equipment Name with Broad Specifications	PrO. No.
1.	Turbo C	1 to 10
2.	Computer system with latest operating system.	1 to 10

10. Suggested Project List & Student Activities:

Sr. No.	Activity.
1.	Other than the classroom and laboratory learning, following are the suggested student-related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course.
2.	They should also collect/record physical evidence for their (student's) portfolio which may be useful for their placement interviews: a) Present seminar on various topics from course content b) Prepare poster of BCP based programs. c) Mini project for software
