Programme : Diploma in Information Technology and Computer Engineering (Sandwich Pattern)												
Course Code:IT23102					**Course Title : Logic Development using C Programming**							
Compulsory / Optional: Compulsory												
Teaching Scheme and Credits						**Examination Scheme**						
CL	**TL**	**LL**	**SLH**	**NLH**	**Credits**	**FA-TH**	**SA-TH (3Hrs.)**	**FA-PR**	**SA**		**SLA**	**Total**
									PR	**OR**		
3	-	4	1	8	4	30	70	25	50#	-	25	200

Total IKS Hrs. for course:

Abbreviations: CL- Class Room Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

Note:
1. FA-TH represents an average of two class tests of 30 marks each conducted during the term.
2. SA-TH represents the end term examination.

I. Rationale

In today's information technology era, computer Technology plays an important role. Computer applications are all pervasive in day to day life of human being. It became compulsory to all employable to have sound knowledge of how computer works and process data and information. This subject coversfromthebasicconceptofCtopointersinC.Thiscoursewillactas"programmingconceptdeveloper"forstudents.Itwill alsoactas"Backbone"forsubjectslikeOOPS,VB,Windows Programming, JAVA, OOMD, etc.

II. Industry / Employer Expected Outcome

Students should be able to develop application in C programming.

III. Course Outcomes: Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1	Illustrate the Flow chart and describe an algorithm for a given program.
CO2	Understand I/O statements in C
CO3	Use Conditional and iterative statements in C programs
CO4	Demonstrate arrays and strings
CO5	Demonstrate the use of user defined functions to solve real time problems
CO6	Understand Structures and unions and Files.
CO7	Describe the use of pointers

Course Content Details:

Unit No.	Topics / Sub-topics
1	**Program Logic development** 1.1 Fundamentals of algorithms: Notion of an algorithm. Pseudo-code conventions like assignment statements and basic control structures. 1.2 Algorithmic problems: Develop fundamental algorithms for (i) Exchange the values of two variables with and without temporary variable, (ii) Counting positive numbers from a set of integers, (iii) Summation of set of numbers, (iv) Reversing the digits of an integer, (v) Find smallest positive divisor of an integer other than 1, (vi) Find G.C.D. and L.C.M. of two as well as three positive integers, (vii) Generating prime numbers. 1.3 Flow chart: Draw flow charts for all algorithms developed **Course Outcome- CO1 Teaching Hours – 05 Marks: 10 (R-02 U-02 A-06)**
2	Basics of C programming 2.1 Different approaches in programming: Procedural approach, Object Oriented approach, Event Driven approach. 2.2 Structure of C: Header and body, Use of comments, Compilation of a program. 2.3Data Concepts: Variables, Constants, data types like: int, float char, double and void. Qualifiers: short and long size qualifiers, signed and unsigned qualifiers. Declaring variables, Scope of the variables according to block, Hierarchy of data types. 2.4 Operators in C:Logical , Arithmetic, Bitwise, Relational, Assignment 2.5 Basic Input output: C program structure, Input and output using printf() and scanf(), character I/O.(Programs based on I/O) **Course Outcome- CO2 Teaching Hours – 08 Marks:12(R-02 U-04 A-06)**
3	**Control Structures** 3.1 Decision making: If Statement, If else statement, Nesting of if-else 3.2 branching: The switch statement 3.3 Looping: While loop, Do-while loop, For loop 3.4 Ternary operator 3.5 Go to statement 3.6 Use of break and continue statements

	Course Outcome- CO3 Teaching Hours – 10 Marks:08 (R-02 U-04 A-04)
4	**Arrays and Strings** 4.1 One dimension, two dimension and multidimensional arrays 4.2 Array declaration 4.3 Array initialization 4.4 calculating the length of an array 4.5 Operation on array 4.6 String input/output 4.7 String operations 4.8 Array of strings **Course Outcome- CO4 Teaching Hours – 08 Marks:12 (R-02 U-04 A-06)**
5	**Functions** 5.1 Concept of library functions 5.2 String functions (comparison, concatenation, length) 5.3 User-defined functions 5.4 Local & global variables 5.5 Parameter passing 5.6 Storage classes **Course Outcome- CO5 Teaching Hours – 05 Marks:08 (R-02 U-02 A-04)**
6	**Structure and Union and Files** 6.1 Basic Concept 6.2 Structure declaration, initialization 6.3 Structure within structure 6.4 Nested Structures 6.5 Array of Structure

	6.6 Union 6.7 Creating a file 6.8 CRUD operations on File. **Course Outcome- CO6 Teaching Hours:05 Marks:10 (R-02 U-04 A-04)**
7	**Pointers** 7.1Basic concept 7.2Pointer & arrays 7.3Pointer & functions 7.4 Pointer arithmetic **Course Outcome- CO7 Teaching Hours:06 Marks:08 (R-02 U-02 A-04)**

IV. Laboratory Learning Outcome and Aligned Practical / Tutorial Experiences.

Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant Cos
1	Write an algorithm and draw the flow chart for following: a)To find out number is odd or even. b) To find out factorial value of a number. c) To check a number is prime number or not.	4	CO1
2	Program based on Input/output statement. a)To find out number is odd or even. b) To find out factorial value of a number. c) To check a number is prime number or not.	4	CO2
3	Program using control structures: Branching a) To find whether the input number is even or odd. b) To find whether the number entered is positive or negative. c) To find the greatest number among three numbers using nested if d) Program that asks user an arithmetic operator („+“,“-„,“*“ or „/“) and take two operands and perform the corresponding calculation on the operands using switch case	4	CO3
4	Program using control structures: Looping(using loops) a) To find the sum of first n natural numbers where n is entered by user. b) To Find Number of Digits in a Number.	4	CO3

	c) To check whether a number is palindrome or not. d) To Generate Multiplication Table.		
5	Program for arrays – b) to accept values in 2-Dimensional 3 by 3 arrays and display the sum of all the elements. c) Program to compute the sum of all elements stored in an array using pointers	4	CO4
6	Program using array of strings.	4	CO4
7	Program to perform different operations on string.	4	CO4
8	Program using function(call by value) a) to swap to numbers b) to find square of given number	4	CO5
9	Program using structure and union a) To store information of 3 students (Name, Roll No, Marks) b) To store information of 2 employees (emp_id, name,salary) and display the details of the employee having salary greater than Rs. 5000.	4	CO6
10	Write a program to print following pattern * ** ****	4	CO6
11	Program using pointer.	4	CO7
12	Program using pointer Arithmetic.	4	CO7
13	Write a program to perform CRUD operations on Files	4	CO6
14	Mini Project	4	ALL
Total		60	

V. Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning):

1. Bank Management System
2. Calendar Application Project
3. Contact Management System
4. Departmental Store Management
5. Personal Diary Management
6. Quiz Game Project

VI. Specification Table:

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Program Logic development	2	4	4	10
2	Basics of C programming	2	4	6	12
3	Control Structures	2	4	4	10
4	Arrays and Strings	4	4	4	12
5	Functions	2	2	4	8
6	Structure and Union	2	4	4	10
7	Pointers	2	2	4	8
	Total	**16**	**24**	**30**	**70**

VII. Assessment Methodologies/Tools

Formative assessment (Assessment for Learning)

Rubrics for continuous assessment based on process and product related performance indicators (___ marks)

Summative Assessment (Assessment of Learning)

End term examination, Viva-voce, Workshop performance (__marks)

VIII. COs - POs Matrix Form

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	**PO-2 Problem Analysis**	**PO-3 Design/ Development of Solutions**	**PO-4 Engineering Tools**	**PO-5 Engineering Practices for Society, Sustainability and Environment**	**PO-6 Project Management**	**PO-7 Life Long Learning**	**PSO - 1**	**PSO - 2**	**PSO - 3**
CO1	3	-	-		2	1	-	2		1
CO2	1	3	2	2	-	-	1		2	-
CO3	-	2	-	-	3	1	2	2	-	-
CO4	2	-	2	--	-	2	-	3	-	-
CO5	2	-	-	2	2	-	1	-	2	-
CO6	-	2	-	-	3	1	-	1		1
CO7	1	-	1	2	-	-	3	-	3	-

Legends: - High:03, Medium:02, Low:01, No Mapping: --

IX. Suggested Learning Materials / Books

Sr.No	Author/ Publisher	Title	ISBN
1	Brian W. Kernighan, Dennis Ritchie Prentice Hall	The C Programming language	978-0131103627
2	E. Balgurusamy The Mc-Graw Hill	Programming in ANSI C	978-9339219666
3	Yashawant Kanetkar BPB Publications	Let us C	978-9387284494

X. Learning Websites & Portals

Sr.No	Link / Portal
1	https://www.w3schools.com
2	https://www.tutorialspoint.com
3	www.cppinstitute.org/
4	https://www.programiz.com › c-programming
5	https://www.javatpoint.com › c-programming-language-tutorial
6	https://beginnersbook.com › 2015/02 › simple-c-programs

7	https://www.udemy.com › c-programming-for-beginners

XI. Academic Consultation Committee/Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organization
1	Mr. Vaibhav Ashok Wankhade	Software Engineer	WhiteCode Canada
2	Ms. Namrata A. Wankhade	Lecturer in Information Technology	Government Polytechnic Mumbai
3	Ms. Pradnya Natekar	Lecturer in Computer engineering	Shree Baghubai Maftalal Polytechnic, Mumbai

Coordinator,
Curriculum Development,
Department of _____ Engineering

Head of Department
Department of _____ Engineering

I/C, Curriculum Development Cell

Principal