FACULTY OF TECHNOLOGY & ENGINEERING
U & P U. PATEL DEPARTMENT OF COMPUTER ENGINEERING

CE143: COMPUTER CONCEPTS AND PROGRAMMING

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	3	4	-	7	**5**
Marks	100	100	-	200	

A. Outline of the Course:

Sr. No.	Title of the unit	Minimum number of hours
1.	Introduction to 'C' Language.	02
2.	Constants, Variables & Data Types in 'C'	03
3.	Operators and Expression in 'C'	03
4.	Managing Input & Output Operations	01
5.	Conditional Statements & Branching	03
6	Looping	03
7	Arrays	04
8	Character Arrays and Strings	05
9	User-Defined Function in 'C'	05
10	Structures and Unions	03
11	Pointers	06
12	File Management in 'C'	05
13	Dynamic Memory Allocation	02

Total hours (Theory): 45 Hrs.

Practical Hours: 60 Hrs.

Total hours: 105 Hrs.

B. Detailed Syllabus:

1 Introduction to 'C' language. 02 Hours 05%

Program, Software, Instruction, debugging, compilation and execution of C Program, Difference between Header files & library files, Compiler and Interpreter, Procedure Oriented

	Language, Importance of C, Basic structure of C, Algorithms & Flowchart.		
2	**Constants, Variables & Data Types in 'C'** Character set, C tokens, Keywords & Identifiers , Data types , Constants, Variables, Declaration of Variables, Assigning Values to Variables, Declaring a variable as Constant, Defining Symbolic constants.	**03 Hours**	**06%**
3	**Operators and Expression in 'C'** Classification of operators: Arithmetic, Relational, Logical, Assignment, Increment / Decrement, Conditional, Bitwise, Special Operators. Unary, Binary and Ternary Operators. Arithmetic expression, Evaluation, Type conversion: Implicit &Explicit, Precedence and Associativity, Various library functions from maths.h.	**03 Hours**	**06%**
4	**Managing Input & Output Operations** Reading a Character, Writing a Character, Various library functions from ctype.h. Formatted Input, Formatted Output	**01 Hours**	**02%**
5	**Decision Making & Branching** Decision making using simple if, if…else statement, nesting of if…else, else…if Ladder. Switch statements, conditional operator, goto statement.	**03 Hours**	**06%**
6	**Looping** Need of looping, (pre-test) entry-controlled loop: while, for, (post-test) exit-controlled loop: do…while, difference between Counter- Controlled loops and Sentinel - controlled loops. Nesting of looping statements, use of break & continue, use of if…else in loop, infinite loop.	**03 Hours**	**08%**
7	**Arrays** Need of array, Declaration & Initialization of 1D array, Programs of 1D. 2D array, Memory allocation of 1D and 2D array, 2D array basic programs.	**04 Hours**	**08%**
8	**Character Arrays and Strings**	**05 Hours**	**10%**

	Difference of character array with numeric array and importance of NULL character. Declaration, Initialization and various input and output methods of string, formatted output of string, arithmetic operations on characters. Various functions of string.h: strlen, strcat, strcmp, strcpy, strrev, strstr, etc. Two dimensional character array (table of strings).		
9	**User-Defined Function in 'C'** Need of modularization, advantages, Introduction to user-defined function, Function Prototype, Function Call, Function Body. Call by value, Actual &Formal Arguments, return value, Categories of functions, Nesting of Functions, Recursion. Array as Function arguments, Storage Classes: Scope, Life of a variable in 'C'.	**05 Hours**	**14%**
10	**Structures and Union** Need of user-defined data type, Structure definition, Declaration and Initialization of variables, Array as member, Array of structure variables. Structure within structure, Structure as function arguments, Union.	**03 Hours**	**08%**
11	**Pointers** Introduction to pointer, declaration & initialization, access value using pointer, indirection (*) operator. Pointers in expressions, scale factor, 1D-array and pointer, pointer with strings, Array of pointers. Pointer as arguments in function, Call by address, Functions returning pointers, Pointers and structures, Chain of Pointers.	**06 Hours**	**14%**
12	**File Management in 'C'** Introduction, Defining and Opening a file, closing a file, modes of file, read & write single character and integer to file, use of fprintf and fscanf functions. Error handling functions, random access of files using ftell, rewind, fseek, command line argument.	**05 Hours**	**8%**
13	**Dynamic Memory Allocation** Introduction, memory allocation process. Use of functions: malloc ( ), calloc ( ), realloc ( ) and free ( ).	**02 Hours**	**05%**

Course Outcome (COs):

At the end of the course, the students will be able to

CO1	Demonstrate problem solving skills by developing algorithms and drawing flowcharts to solve simple problems, Understand the process of compiling and executing a C program and recognize various C tokens and datatypes.
CO2	Understanding various programming constructs and applying it for the problems given in hand.
CO3	Demonstrate the use of various data structures like array, file and structure.
CO4	Applying the concepts of top-down modular programing to decompose problem and a program solution into smaller pieces and Analyse how length of the source program can be reduced by using functions.
CO5	Evaluate how pointers are effective in handling arrays, functions and data tables and how pointers support Dynamic memory management.
CO6	Develop C Programs using various methods described above to solve real-world problems.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	-	-	-	-	1	2	2	1	1	2	-
CO2	3	3	2	-	-	-	-	-	1	-	-	2	3	-
CO3	3	2	2	-	-	-	-	-	1	-	-	2	3	-
CO4	3	3	3	-	-	-	-	-	2	-	-	3	3	-
CO5	3	3	3	-	-	-	-	-	2	-	-	3	3	-
CO6	3	3	3	-	-	-	-	-	2	-	1	3	3	-

Enter correlation levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

If there is no correlation, put "-"

Recommended Study Material:

- **Text book:**
  1. Programming in ANSI C, 8th Edition by E Balagurusamy, MGrawHill
  2. Let us C, 16th Edition by Yashwant Kanetkar, BPB Publication
  3. Programming in C , 2nd Edition by Pradeep Dey & Manas Ghosh

- **Reference book:**

1. Head First C by David Griffiths & Dawn Griffiths.
2. C How to program, 7/E by Deitel&Deitel, Prentice Hall
3. C: The Complete Reference by Herbert Schildt
4. Practical C Programming (Third Edition) by Steve Oualline

❖ **Web material:**

1. www.tutorials4u.com/c/
2. www.cprogramming.com/tutorial.html
3. www.howstuffworks.com/c.htm
4. http://www.programmingtutorials.com/c.aspx
5. http://www.physics.drexel.edu/courses/Comp_Phys/General/C_basics/

❖ **Software:**

1. Code::Blocks
2. Turbo C