Subject Code		**Total Contact Hour**	**40 hours**
Semester	FIRST/SECOND	**Total credit**	**3**
Subject Name	**Programming in C and Data Structure**		
Pre-requisites	**Fundamentals of Computers**		

Course Objectives:

- Learn fundamentals of C programming
- Learn various steps of program development and implementation
- Learn different Data Structures for structured programming approach
- Learn relation of memory and memory referencing with the program execution
- Learn to implant small projects

Syllabus

Module I: Fundamentals of C	**Hours- 10**
Problem-solving processes: Algorithms and Flow Chart. C as a Middle-level language, Structure of C program, Character set Identifiers, Keywords, Data Types, Constant and Variables, Statements, Input and Output statements, Operators and Expressions, Precedence of operators, Control Structures (If, If-else, Switch-case, For loop, While, do-While)	
Module II: Function, Array, Structure and Union	**Hours-9**
Functions (Built-in, user-defined), Recursive function. Array: 1 – D, 2 – D, Matrix operations, String, Passing Array to Function, Structure, Union	
Module III: Pointer & Dynamic Memory Allocation	**Hours-8**
Pointer Arithmetic, Parameter passing using pointers, Call by value vs. Call by reference, Passing parameters, pointer to pointer, pointer to function, Pointer to Structure, Array and pointers, Static vs. Dynamic memory, Pointer variables, Dynamic memory allocation functions [malloc (), calloc (), realloc (), free ()]	
Module IV: Data Structures	**Hours-7**
Introduction to Data Structure, Linear Linked List: Creation, Insertion, Deletion. Stack, Stack applications (Infix to postfix, postfix evaluation), Queue (linear & circular)	
Module V: Tree, Introduction to Sorting & Searching	**Hours-6**
Binary Tree, Binary Search Tree, Sorting (Bubble Sort, Quick Sort), Searching (Linear Search, Binary Search)	

Essential Readings:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. Programming in C, Pradip Dey, Manas Ghosh, Oxford Publication
3. Data Structures - (Schaum's Outlines), McGraw-Hill Education

Supplementary Readings:

1. Let us C- Yashwant Kanetkar, BPB Publications.
2. Programming with ANSI and Turbo C- Kamthane, A. N. Pearson Education
3. R. S. Salaria, Programming for Problem Solving, Khanna Publishing House
4. The C Programming Language – Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall.
5. Data Structures Using C - Amiya Kumar Rath, Alok Kumar Jagadev, Scitech Publications

Course Outcomes:

The students will learn and able to

- Remember, understand and implement simple algorithms to C programs.
- Test and execute programs using function, array, structure and union.
- Analyze the relation of memory and memory referencing with the program execution.
- Apply different Data Structures for problem solving.
- Implement different sorting and searching algorithms.