# **Programming for Problem Solving**

## Unit 1

Introduction to Programming

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)

Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code-

## Unit 2

Arithmetic expressions and precedence Conditional Branching and Loops Writing and evaluation of conditionals and consequent branching Iteration and loops

# Unit 3

Arrays Arrays (1-D, 2-D), Character arrays and Strings

## Unit 4

Basic Algorithms

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

# Unit 5

Function

Functions (including using built in libraries), Parameter passing in functions, callby value, Passing arrays to functions: idea of call by reference

#### Unit 6

Recursion

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

## Unit 7

Structure Structures, Defining structures and Array of Structures

## Unit 8

Pointers

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

#### Unit 9

File handling (only if time is available, otherwise should be done as part of the lab)