MODULE 1: INTRODUCTION TO PROGRAMMING (6 LECTURES)

- **Components of a Computer System**
  - Disks
  - Memory
  - Processor
  - Where a Program is Stored and Executed
  - Operating System
  - Compilers
- **Idea of Algorithm**
  - Steps to Solve Logical and Numerical Problems
  - Representation of Algorithm
    - Flowchart/Pseudo Code with Examples
- **From Algorithms to Programs**
  - Source Code
  - Variables (with Data Types)
  - Variables and Memory Locations
  - Type Casting/Type Conversion
  - Run Time Environment (Static, Dynamic Location)
  - Storage Classes (Auto, Register, Static, Extern)
  - Syntax and Logical Errors in Compilation
  - Object and Executable Code

MODULE 2: OPERATORS (3 LECTURES)

- Arithmetic Expressions
- Arithmetic Operators
- Relational Operators
- Logical Operators
- Bitwise Operators
- Precedence

MODULE 3: CONDITIONAL BRANCHING AND LOOPS (5 LECTURES)

- Writing and Evaluation of Conditionals and Consequent Branching
- Iteration and Loops

MODULE 4: ARRAYS (4 LECTURES)

- Array Declaration and Initialization
- Bound Checking
- Arrays (1-D, 2-D)
- Character Arrays and Strings

MODULE 5: BASIC ALGORITHMS (6 LECTURES)

- **Searching**
  - Linear Search
  - Binary Search
- **Basic Sorting Algorithms**
  - Bubble Sort
  - Insertion Sort
  - Selection Sort
- Finding Roots of Equations
- Notion of Order of Complexity through Example Programs (No Formal Definition Required)

MODULE 6: FUNCTION (4 LECTURES)

- Introduction and Writing Functions
- Scope of Variables
- Functions (Including Using Built-in Libraries)
- Parameter Passing in Functions
  - Call by Value
  - Passing Arrays to Functions: Idea of Call by Reference

MODULE 7: RECURSION (5 LECTURES)

- Recursion as a Different Way of Solving Problems
- **Example Programs**
  - Finding Factorial
  - Fibonacci Series
  - Reverse a String using Recursion
  - GCD of Two Numbers
  - Ackerman Function
  - Quick Sort or Merge Sort

MODULE 8: STRUCTURE/UNION (3 LECTURES)

- **Structures**
  - Accessing Structure Elements
  - Way of Storage of Structure Element
  - Defining Structures and Array of Structures
- Basic Definition of Union
- Comparison Between Structure and Union with Example

MODULE 9: POINTERS (5 LECTURES)

- Idea of Pointers
- Defining Pointers
- Use of Pointers in Self-Referential Structures

- Notion of Linked List (No Implementation)
- Pointer to Pointer
- Pointer to Array
- Pointer to Strings
- Array of Pointer
- Pointer to Function
- Pointer to Structure

MODULE 10: FILE HANDLING

- Only if time is available, otherwise should be done as part of the lab.