**Course Objective:**  
To acquaint the student with computer software and high level programming languages. Emphasis will be given on developing computer programming skills using computer programming in C and FORTRAN languages.

1. **Overview of computer software & programming languages(2 hours)**
   1. System software
   2. Application software
   3. General software features and recent trends
   4. Generation of programming languages
   5. Categorization of high level languages

1. **Problem solving using Computer(2 hours)**
   1. Problem analysis
   2. Algorithm development and Flowchart
   3. Compilation and Execution
   4. Debugging and Testing
   5. Programming Documentation

1. **Introduction to ‘C’ programming(3 hours)**
   1. Character set, Keywords, and Data types
   2. Preprocessor Directives
   3. Constants and Variables
   4. Operators and statements

1. **Input and Output(2 hours)**
   1. Formatted input/output
   2. Character input/output
   3. Programs using input/output statements

1. **Control statements(6 hours)**
   1. Introduction
   2. The goto, if, if … … else, switch statements
   3. The while, do … while, for statements

1. **User-Defined Functions(4 hours)**
   1. Introduction
   2. Function definition and return statement
   3. Function Prototypes
   4. Function invocation, call by value and call by reference, Recursive Functions

1. **Arrays and Strings(6 hours)**
   1. Defining an Array
   2. One-dimensional Arrays
   3. Multi-dimensional Arrays
   4. Strings and string manipulation
   5. Passing Array and String to function

1. **Structures(4 hours)**
   1. Introduction
   2. Processing a Structure
   3. Arrays of Structures
   4. Arrays within Structures
   5. Structures and Function

1. **Pointers(4 hours)**
   1. Introduction
   2. Pointer declaration
   3. Pointer arithmetic
   4. Pointer and Array
   5. Passing Pointers to a Function
   6. Pointers and Structures

1. **Data Files(4 hours)**
   1. Defining opening and closing a file
   2. Input/Output operations on Files
   3. Error handling during input/output operations

1. **Programming Language: FORTRAN(8 hours)**
   1. Character set
   2. Data types, Constants and variables
   3. Arithmetic operations, Library Functions
   4. Structure of a Fortran Program
   5. Formatted and Unformatted Input/Output Statements
   6. Control Structures: Goto, Logical IF, Arithmetic IF, Do loops
   7. Arrays: one dimensional and two dimensional

**Laboratory:**

1. Minimum 6 sets of computer programs in C (from Unit 4 to Unit 10) and 2 sets in FORTRAN (from unit 11) should be done individually.(30 marks out of 50 marks)
2. Student (maximum 4 persons in a group) should submit mini project at the end of course.(20 marks out of 50 marks)

**References:**

1. Kelly & Pohl, “*A Book on C*”, Benjamin/Cumming
2. Brian W. Keringhan & Dennis M. Ritchie, “*The ‘C’ Programming Language*”, PHI
3. Bryons S. Gotterfried, “*Programming with C*”, TMH
4. Yashavant Kanetkar, “*Let Us C*”, BPB
5. D. M. Etter, “*Structured Fortran & for Engineers and Scientist*”, The Benjamin/Cummings Publishing Company, Inc.
6. Rama N. Reddy and Carol A. Ziegler, “*FORTRAN 77 with Applications for Scientists and Engineers*”, Jaico Publishing House
7. Alexis Leon, Mathews Leon, “*Fundamentals of Information Technology*”, Leon Press and Vikas Publishing House

**Evaluation Scheme:**  
There will be questions covering all the chapters in the syllabus. The evaluation scheme for the question will be as indicated in the table below:

|  |  |  |
| --- | --- | --- |
| **Chapter** | **Hours** | **Mark distribution\*** |
| 1, 2 | 4 | 8 |
| 3, 4 | 5 | 8 |
| 5 | 6 | 10 |
| 6 | 4 | 8 |
| 7 | 6 | 10 |
| 8 | 4 | 8 |
| 9 | 4 | 8 |
| 10 | 4 | 8 |
| 11 | 8 | 12 |
| Total | 45 | 80 |

**\*Note: There may be minor deviation in marks distribution.**