Computer Programming

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)
    a. System software
    b. Application software
    c. General software features and recent trends
    d. Generation of programming languages
    e. Categorization of high level languages

2. Problem solving using Computer(2 hours)
    a. Problem analysis
    b. Algorithm development and Flowchart
    c. Compilation and Execution
    d. Debugging and Testing
    e. Programming Documentation

3. Introduction to 'C' programming(3 hours)
    a. Character set, Keywords, and Data types
    b. Preprocessor Directives
    c. Constants and Variables
    d. Operators and statements

4. Input and Output(2 hours)
    a. Formatted input/output
    b. Character input/output
    c. Programs using input/output statements

5. Control statements(6 hours)
    a. Introduction
    b. The goto, if, if … … else, switch statements
    c. The while, do … while, for statements

6. User-Defined Functions(4 hours)
    a. Introduction
    b. Function definition and return statement
    c. Function Prototypes
    d. Function invocation, call by value and call by reference, Recursive Functions

7. Arrays and Strings(6 hours)
    a. Defining an Array
    b. One-dimensional Arrays
    c. Multi-dimensional Arrays
    d. Strings and string manipulation
    e. Passing Array and String to function

8. Structures(4 hours)
    a. Introduction
    b. Processing a Structure
    c. Arrays of Structures
    d. Arrays within Structures
    e. Structures and Function

9. Pointers(4 hours)
    a. Introduction
    b. Pointer declaration
    c. Pointer arithmetic
    d. Pointer and Array
    e. Passing Pointers to a Function
    f. Pointers and Structures

10. Data Files(4 hours)
    a. Defining opening and closing a file
    b. Input/Output operations on Files
    c. Error handling during input/output operations

11. Programming Language: FORTRAN(8 hours)
    a. Character set
    b. Data types, Constants and variables
    c. Arithmetic operations, Library Functions
    d. Structure of a Fortran Program
    e. Formatted and Unformatted Input/Output Statements
    f. Control Structures: Goto, Logical IF, Arithmetic IF, Do loops
    g. 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.**