

## **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

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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

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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

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4. Input and Output(2 hours)

- a. Formatted input/output
- b. Character input/output
- c. Programs using input/output statements

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5. Control statements(6 hours)

- a. Introduction
- b. The goto, if, if ... else, switch statements
- c. The while, do ... while, for statements

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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

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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