

## MC125-Computer Programming and Problem Solving Lab

### Course Description and Objective:

The purpose of this course is to introduce to students to the field of programming using C language. The students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in C.

### Course Outcomes:

The student will be able to:

- Apply and practice logical ability to solve the problems.
- Understand C programming development environment, compiling, debugging, linking and executing a program using the development environment
- Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
- Understand and apply the in-built functions and customized functions for solving the problems.
- Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.

#### 1. Programs using Input, output and assignment statements

- a) Write a program to print Name, Address and Birth Date.
- b) Write a program to add, multiply and divide two integers and float numbers.
- c) Write a program to convert meters to Feet.
- d) Write a program to accept number of days and print year, month and remaining days.

#### 2. Programs using Branching statements

- a) Write a program to find the largest of three numbers.
- b) Write a program to check whether the entered number is prime or not.
- c) Write a program to check whether the entered number is even or odd.
- d) Write a program to find the roots of an equation  $ax^2 + bx + c = 0$ .

#### 3. Programs using Looping statements

- a) Write a program to print 1 2 3 4 5 .....10.
- b) Write a program to print series 2, 4, 6, 8,.....n.
- c) Write a program to print series 2, 4, 16,..... $n^2$  using shorthand operator and while loop
- d) Write a program to generate fibonnacci series.  
(A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence)
- e) Write a program to print the multiplication table.
- f) Write a program to find a factorial of the given number.
- g) Write a program to check whether the given number is Armstrong or not.
- h) Write a program to check whether the given number is Strong number or not.
- i) Write a program to check whether the given number is Perfect number.
- j) Write a program to print all the numbers and sum of all the integers that are greater than 100 and less than 200 and are divisible by 13.

#### 4. Programs using Functions

- a) Write a program to find Fibonacci series till given number.
- b) Write a program to check whether a number is a palindrome.
- c) Write a program to print upper and lower triangular matrix.
- d) Write a program to calculate sum and average of numbers in an array.
- e) Write a program to calculate maximum and minimum value in an array.

#### 5. Programs using Arrays

- a) Write a program to find maximum element from 1-Dimensional array.
- b) Write a program to sort given array in ascending order.
- c) Write a program to transpose a matrix.

- d) Write a program to add, subtract and multiply two matrices.
6. Programs using Structures
- a) Define a structure called book that will describe the following information: Title of the book, Subject, Cost. Write a program to read the information about the 10 books and print subject-wise list containing name of the book with its cost.
  - b) Declare a structure with members: name, code, age, weight and height. Read the information of 10 persons and print the list of persons details whose weight is in between 35 and 50 kgs.
7. Programs using strings
- a) Write a program to find string length.
  - b) Write a program that will read a text and count all occurrences of a particular alphabet
  - c) Write a program that will read a string and rewrite it in the alphabetical order. i.e. the word HELLO should be written as EHLLO.
  - d) Write a program that appends the one string to another string.
  - e) Write a program that finds a given word in a string.
  - f) Write a program that checks a given string for palindrome.
  - g) Write a program to find the number of vowels, blank spaces and other characters in a string.
8. Programs using Pointers
- a) Write a program using pointers to read an array of integers and print its elements in reverse order.
  - b) Write a function to calculate the roots of the quadratic equation. The function must use two pointer parameters, one to receive the coefficients a, b, and c, and the other to send the roots to the calling function.
  - c) Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.
  - d) Write a function to swap two values using pointers
9. Programs using Recursion
- a) Write a recursive program to calculate the factorial of a given number
  - b) Write a recursive program to print Fibonacci series using recursion
10. Programs using Files
- a) Write a program to create a file.
  - b) Write a program to copy one file into another file
  - c) Write a program to merge two files

**TEXT BOOK :**

1. Yashwanth P. Kanethkar, "Let us C", 8th ed., BPB Publisher, 2007.

**REFERENCE BOOK :**

1. B.A. Forouzan and R.F. Gilberg, "Computer science, A structured programming approach using C", 3rd ed., Thomson, 2007.