II/IV B. TECH. FIRST SEMESTER
ADVANCED C PROGRAMMING LAB
(Required)

Course Code : CS 3L2   **Credits: 2**
Lab Hours: 3 periods/ week   **Internal assessment: 25 Marks**
Tutorial:-   **Semester end examination: 50 Marks**

Prerequisites: C Language

Course Objectives:

1. The objective of this course is to introduce advanced constructs in C programming language. Students will apply these constructs and problem solving methodology to solve complex problems

Course Outcomes:

At the end of this course student will:

CO1) Analyze and apply the debugging techniques in 'C' programs.

CO2) Develop 'C' programs in structured programming orientation.

CO3) Develop the user defined data types for simplifying the data manipulation.

CO4) Apply the file manipulation concepts to organize data.

CO5) Implement the 'C' programs by a team of people for engineering applications

Syllabus:

 Implement 'C' Program for the following.

Exercise – 1

1. Pass the radius as parameter to a function, Compute and display area and circumference of a circle.

2. You want to draw a diagram (House) on screen and prepare a structure chart.

3. Implement a function to perform addition and subtraction of two complex numbers and prepare structure chart.

Exercise - 2

1. Develop a Function Scale multiplies its first argument by 10 raised to the power indicated by its second argument (an integer).

2. Develop a function that separate the given floating point number into sign, whole number magnitude and fractional part.

3. Implement a function to sort three numbers using call by reference.

Exercise - 3

1. You are working problems in which you must display your results as integer ratios. Therefore you need to be able to perform computations with common fractions and get results that are common fractions in reduced form. You want to write a program that will allow you to add, subtract, multiply, and divide several pairs of common fractions.

2. Write a recursive function find_sum that calculates the sum of successive integers starting at 1 and ending at n (i.e., find_sum(n)=1+2+3+…..(n-1)+n).

Exercise - 4

1. Write a program to print a table of differences. Compute the mean and standard deviation of an array of data and displays the difference between each value and the mean.

2. Using arrays to represents the three vertices of a triangle, calculate the length of the three sides of triangle formed with these vertices. Then determine whether triangle can be formed with given vertices.

Exercise - 5

1. The Sales manager of your company needs a sales analysis program to track sales performance by salesperson and by quarter. The program will read all sales transactions from a two dimensional array. The data for each transaction will be the salesperson's number, the quarter in which sale took place, and the sales amount. The sales transactions are in no particular order. After scanning all sales transactions, the program should display a table form which includes totals by person and by quarter.

Exercise - 6

1. Implement a function to change the representation of a date from a string containing day, month and name and year to three integers(month day year) and vice versa.

2. Write a program to delete the given word in a sentence.

   Example : Enter the sentence : Ram is a good boy

   Enter the word to be deleted : good

   After deletion the sentence is as follows ….. Ram is a boy.

Exercise - 7

1. A company manufactures three types of UPS models. At the end of any month serial numbers are to be generated for each of the models manufactured. The last serial number of each type of model has to be taken into consideration for generating the new set of serial number for each set of models. At the end of particular month the following data is available for generating the new serial numbers model-wise:

Model Type	Units manufactured	Last serial number
Ups1	3	24
Ups2	4	19
Ups3	5	9

A program has to be written that generates the new serial numbers for each model type for the month under consideration taking the above as input.

Exercise - 8

1. We are working on engineering project that use complex number for modeling of electric circuits. We need to develop a user-defined structure type and a set of operations that will make complex arithmetic virtually as straight forward as arithmetic on C's built-in numeric types.

Exercise - 9

1. Write a program to read and display a two dimensional array by reading number of rows and columns, And also allocate memory dynamically for an array.

2. The CEO signs vouchers, cheques, and documents where the amount is given in digits as well as in words. Every time before signing these, the CEO checks up whether the amount written in words matches with that of digits. To do this swiftly the CEO needs a program in the counter that would accept the value written on vouchers, cheques, and documents and display the amount in words. The amount in any case should not exceed Rs.99 crores. A program has to written to perform this task.

Exercise - 10

1. A program has to be written that takes student data as input and display the same in the order of entry. It should provide the user the option to choose to display of a particular student given by their name or the roll number.

   Displaying all student records in an order of name or ascending order of grade should also be provided as options.

Exercise - 11

1. Write a C program that takes the name of a file as a command line argument , opens the file, reads through it to determine the number of words in each sentence, displays the total number of words and sentences, and computes the average number of words per sentence. The results should be printed in a table such as below:

   This program counts the words and sentences in file " comp.txt".

   Sentence : 1 Words : 29

   Sentence : 2 Words :41

   Sentence : 3 Words : 16

   File "comp.txt" contain 86 words in 3 sentences for an average of 28.3 words per sentence.

Exercise - 12

1. A computer phone book containing name of persons, their home, office and mobile phone numbers has to be prepared. This book should have the necessary provision for adding, editing and deleting phone numbers and display the phone number of any person from the Phone book as and when required.

Learning Resource

Text Books

1.   Problem Solving and Program Design in C, Jeri R. Hanly, Ellot B. Koffman, 7th Edition, Pearson.

2.   Programming in C , Pradip Dey, Manas Ghosh, Second Edition , Oxford Education