

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA**

**I Year B.Tech. ECE**

<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>3</b>	<b>4</b>

**COMPUTER PROGRAMMING LAB**

Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C solve the problems
- To Introduce the student to simple linear and non linear data structures such as lists, stacks, queues, trees and graphs.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

**Week 1.**

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) 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. Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

**Week 2.**

- a) Write a C program to calculate the following Sum:  
Sum= $1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$
- b) Write a C program to find the roots of a quadratic equation.

**Week 3**

- a) Write C programs that use both recursive and non-recursive functions
  - i) To find the factorial of a given integer.
  - ii) To find the GCD (greatest common divisor) of two given integers.
  - iii) To solve Towers of Hanoi problem.

**Week 4**

- a) The total distance travelled by vehicle in 't' seconds is given by distance =  $ut+1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,\*, /, % and use Switch Statement)

**Week 5**

- a) Write a C program to find both the largest and smallest number in a list of integers.
- b) Write a C program that uses functions to perform the following:
  - i) Addition of Two Matrices
  - ii) Multiplication of Two Matrices

**Week 6**

- a) Write a C program that uses functions to perform the following operations:
  - i) To insert a sub-string in to given main string from a given position.
  - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

**Week 7**

- a) Write a C program that displays the position or index in the string S where the string T begins, or - 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

**Week 8**

- a) Write a C program to generate Pascal's triangle.  
 b) Write a C program to construct a pyramid of numbers.

**Week 9**

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:  
 $1+x+x^2+x^3+\dots+x^n$

For example: if n is 3 and x is 5, then the program computes  $1+5+25+125$ .

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if  $n < 0$ , then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

**Week 10**

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.  
 b) Write a C program to convert a Roman numeral to its decimal equivalent.

**Week 11**

Write a C program that uses functions to perform the following operations:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

**Week 12**

- a) Write a C program which copies one file to another.  
 b) Write a C program to reverse the first n characters in a file.  
 (Note: The file name and n are specified on the command line.)

**Week 13**

Write a C program that uses functions to perform the following operations on singly linked list.:

- i) Creation
- ii) Insertion
- iii) Deletion
- iv) Traversal

**Week 14**

Write a C program that uses functions to perform the following operations on doubly linked list.:

- i) Creation
- ii) Insertion
- iii) Deletion
- iv) Traversal in both ways

**Week 15**

Write C programs that implement stack (its operations) using  
 i) Arrays ii) Pointers

**Week 16**

Write C programs that implement Queue (its operations) using  
 i) Arrays ii) Pointers

**Week 17**

Write a C program that uses Stack operations to perform the following:

- i) Converting infix expression into postfix expression
- ii) Evaluating the postfix expression

**Week 18**

Write a C program that uses functions to perform the following:

- i) Creating a Binary Tree of integers
- ii) Traversing the above binary tree in preorder, inorder and postorder.

**Week 19**

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :

- i) Linear search
- ii) Binary search

**Week 20**

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

- i) Bubble sort
- ii) Quick sort

**Week 21**

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

- i) Insertion sort
- ii) Merge sort

**Week 22**

Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

**Week 23**

Write C programs to implement the linear regression and polynomial regression algorithms.

**Week 24**

Write C programs to implement Trapezoidal and Simpson methods.

**Text Books**

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Data Structures: A pseudo code approach with C, second edition R.F. Gilberg and B.A. Forouzan
3. Programming in C, P.Dey & M. Ghosh, Oxford Univ.Press.
4. C and Data Structures, E Balaguruswamy, TMH publications.