MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act,1956

EMPOWERING THROUGH INNOVATION
MLRS

COURSE CONTENT

C PROGRAMMING & DATA STRUCTURES LAB

I Semester: CE / ME

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
2510572	Foundation	0	0	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 30				Total Classes: 30		
Prerequisites: NIL								

Course Overview:

This course focuses on developing strong problem-solving and programming skills using the C language through a wide range of practical programs. Students learn to apply control structures, functions, recursion, arrays, strings, and structures to solve mathematical, logical, and real-world problems. The course covers core algorithms such as searching, sorting, and matrix operations, along with string processing and pattern generation. Emphasis is given to modular programming, user-defined functions, and efficient logic building. Learners also gain hands-on experience with dynamic data structures including linked lists, stacks, and queues using arrays and pointers. Overall, the course strengthens analytical thinking and lays a solid foundation for advanced programming and data structures.

Course Objectives:

Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

Course Outcomes:

1. Execute C programs using variables, control structures, loops, and functions to demonstrate program flow in solving engineering problems.
2. Develop modular programs using arrays, strings, recursion, and structures to perform data processing operations in business scenarios.
3. Illustrate the use of pointers, parameter passing techniques, and scope rules through experiments in system-level program development.
4. Implement linear data structures as stacks and queues in algorithmic solutions for real- time applications.
5. Construct programs for singly, circular, and doubly linked lists to handle dynamic memory allocation and data manipulation tasks.

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List of Experiments:

1. Write a C program to find the sum of individual digits of a positive integer.
2. 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.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a quadratic equation.
5. Write a C program to find the factorial of a given integer.
6. Write a C program to find the GCD (greatest common divisor) of two given integers.
7. Write a C program to solve Towers of Hanoi problem.
8. 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)
9. Write a C program to find both the largest and smallest number in a list of integers.
10. Write a C program that uses functions to perform the following:
    i) Addition of Two Matrices
    ii) Multiplication of Two Matrices
11. Write a C program that uses functions to perform the following operations:
    i) To insert a sub-string in to a given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
12. Write a C program to determine if the given string is a palindrome or not
13. 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.
14. Write a C program to count the lines, words and characters in a given text.
15. Write a C program to generate Pascal's triangle.
16. Write a C program to construct a pyramid of numbers.
17. 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.)
18. Write a C program that uses functions to perform the following operations on singly linked list.:
    i) Creation   ii) Insertion   iii) Deletion   iv) Traversal

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

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

21. Write a C program that implements the following sorting methods to
    sort a given list of integers in ascending order   i)
    Bubble sort   ii)
    Selection sort iii)Insertion sort

22. Write C programs that use functions to perform the following
    searching operations for a Key value in a given list of integers:
    i) Linear search   ii) Binary search

TEXT BOOKS:

1. C Programming & Data Structures, B.A. Forouzan and R. F. Gilberg,
   Third Edition, Cengage Learning.
2. Let us C, Yeswanth Kanitkar
3. C Programming, Balaguruswamy.

ELECTRONIC RESOURCES:

1. https://www.geeksforgeeks.org/c/c-programming-language/
2. https://www.programiz.com/c-programming
3. https://www.w3schools.com/c/
4. https://www.codechef.com/learn/course/c
5. https://ds1-iiith.vlabs.ac.in/exp/linked-list/singly-linked-list/sllpractice.html
6. https://ds1-iiith.vlabs.ac.in/exp/linked-list/doubly-linked-list/dllpractice.html
7. https://ds1-iiith.vlabs.ac.in/exp/stacks-queues/stacks/stackarrays.html
8. https://ds1-iiith.vlabs.ac.in/exp/stacks-queues/queues/queuesarrays.html

MATERIALS ONLINE:

1. **Lab Manual**