

CABM-108 Programming In C with Basic Data Structures Lab

Course Title	Programming In C with Data Structures Lab	Course Code	CABM-108
Semester/Year	I Year	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	2
Methodology	Lecture+ Practical	Total Contact Hours	90
CIE	60 Marks	SEE	40 Marks

Prerequisites

Should be familiar with C Language.

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Hours/ Periods	Marks for SEE			Marks weightage	%Weightage
			Coding	Execution	Viva		
1	Programming In C with Basic of Data Structures Lab	45	20	10	10	40	100
	Total	45	40			40	100

Course Outcomes

On successful completion of the course, the students should be able to

Course Outcome	
CO1	Use variables, constants, data types, operators and Input / Output functions in programs
CO2	Apply decision making and looping concepts for developing programs in C language Implement the concepts of arrays and structures for a given problem
CO3	Illustrate the use of functions in developing modular programming, usage of structures and unions
CO4	Files & Pointers
CO5	Implement Dynamic Memory Allocation and different sorting, searching algorithms.
CO6	Implement the concept of stacks, queues and circular queues using arrays, linked list concept.

Course Content

Unit Number	Unit Name	Periods
1	variables, constants, data types, operators and Input / Output functions in programs	6
2	decision making and looping concepts for developing programs in C language Implement the concepts of arrays and structures for a given problem	5
3	functions in developing modular programming, usage of structures and unions	7
4	Files & Pointers	9
5	Dynamic Memory Allocation and different sorting, searching algorithms.	12
6	Stacks, Queues and Circular queues using Arrays, Linked list concept.	6
	Total	45

Recommended books:

1. Let Us C -Yashwanth Kanetkar.
2. ANSI C -E Balaguru Swamy
3. Data Structures : APseudo code Approach with C++ -Gilberg/ Forouzan
4. Data Structures using C -AaronM. Tanenbaum.
5. Data structures through C -Yashwanth Kanetkar
6. C The complete Reference - Schildt Tata McGraw Hill

Suggested E-Learning references:

1. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2. <https://www.programiz.com/dsa>
3. <https://www.geeksforgeeks.org/data-structures/>
4. <https://www.w3schools.in/data-structures-tutorial/intro/>

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

LIST OF EXERCISES

1. Write an algorithm to compute whether a given number is even or odd.
2. Write an algorithm to check whether a given year is leap year.
3. Draw a flowchart to identify whether the given number is a “BUZZ” number or not.
4. Write and execute a C program to compute number of months, number of remaining weeks and number of remaining days, given number of days. (**hint : Input:** 265 days
Output: 8 months, 3 weeks, 4 days)
5. Write and execute a C program to compute Lateral surface area, Total surface area and volume of a cuboid given length, breadth and height.
6. Write and execute a C program to evaluate an expression using operator precedence and associativity rule. (hint: $a+b/c*d-(e*(f-z)\%k)$)
7. Write and execute a C program to display the following pattern using for loop given n rows (hint $n=4$).

```
1
2
1 2 3
1 2 3 4
```
8. Write and execute a C program to reverse a 4 digit number.
9. Write and execute a C program to print all the prime numbers from 2 to n.
10. Write and execute a C program to read two matrices to perform matrix addition.
11. Write and execute a C program to perform matrix multiplication.
 - a. Write and execute a C program to check whether the given string is palindrome or not.
 - b. Write and execute a C program to read a line of text and display the vowels and consonants.
12. Write and execute a C program to compute the following series using functions
 $1 + x + (x^2/2!) + (x^3/3!) + \dots + (x^n/n!)$
13. Write and execute a C program to compute the sum of first n natural numbers using recursion.
14. Write and execute a C program on “TOWERS OF HANOI PROBLEM” using recursion.

15. Write and execute a C program to read two integers and compute sum, difference, product, quotient using “functions with arguments and with return values”.
16. Consider and execute a structure with the following structure members
17. Student name b. PIN c.subject1 marks d. subject2 marks e. subject3 marks
18. Write and execute a Program to compute individual subject total, individual student marks total for n number of students.
19. Write and execute a c program to read, retrieve, and display the members of a union.
20. Write a program to perform arithmetic operations on pointers.
21. Write a program to demonstrate the use of dynamic memory management functions.
22. Write a program on Selection sort.
23. Write a program on insertion sort.
24. Write a program on bubble sort.
25. Implement a program to implement quick sort using recursion.
26. Write a program on linear search.
27. Write a program on binary search.
28. Write a program to implement stacks using arrays.
29. Write a program to implement queue using arrays.
30. Write a program to implement circular queue using arrays.
31. Write a program to evaluate a postfix expression.
32. Write a program to demonstrate insertion, deletion & display operations on singly linked lists.
33. Write a program to implement insertion, deletion and display operations on a doubly linked list.
34. Write a program to perform binary tree traversals operations.

Suggested Student Activities

1. Slip Test on small snippets.
2. Implementation of different application of stacks queues which are beyond the exercise.
3. Implementation of Linked list concept in solving real world problems(Ex:- Addition of two polynomials etc)
4. Implementation of binary search tree.
5. Apply the concept of graphs, and implement different traversal techniques.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	
CO1	1		1			2	1	1,3,6,7
CO2	2						1	1,7
CO3	1		1	2	1	2	1	1,3,4,5,6,7
CO4	1	1		2	2	1	1	1,2,4,5,6,7
CO5	1	2	1	3		3	1	1,2,3,4,6,7
CO6	1	1	1		2	1	1	1,2,3,5,6,7