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| **B. TECH 1st SEMESTER** | **L** | **T** | **P** | **C** |
| **-** | **-** | **3** | **1.5** |
| **19CS1L01: C PROGRAMMING LAB** |

**Course Objectives:**

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| * To impart knowledge on various Editors, Raptor.
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| * To make the students understand the concepts of C programming.
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| * To nurture the students on Control Structures and develop different operations on arrays.
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| * To make use of String fundamentals and modular programming constructs.
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| * To implement programs using dynamic memory allocation.
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| * To explain the concepts of Structure, Unions and files for solving various problems.
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**List of Experiments:**

**1. Introduction to Algorithms and Flowcharts**

 1.1) Implement Algorithm Development for Exchange the values of Two numbers.

 1.2) Given a set of n student’s examination marks (in the range 0-100) make a count of the number of students that passed the examination. A Pass is awarded for all of 50 and above.

 1.3) Given a set of n numbers design an algorithm that adds these numbers and returns the resultant sum. Assume N is greater than or equal to zero.

**2. Introduction to C Programming**

 2.1) Exposure to Turbo C, Code Blocks IDE, Dev C++, Falcon C++.

 2.2) Writing simple programs using printf(), scanf() .

**3. Raptor**

 3.1) Introduction to Raptor.

 3.2) Draw a flow chart to find the Sum of 2 numbers.

 3.3) Draw a flow chart to find Simple interest.

**4. Basic Math**

 4.1) Write a C Program to convert Celsius to Fahrenheit and vice versa.

 4.2) Write a C Program to find largest of three numbers using ternary operator.

 4.3) Write a C Program to Calculate area of a Triangle using Heron's formula.

**5. Control Flow- I**

 5.1) Write a C Program to Find Whether the Given Year is a Leap Year or not.

 5.2*)* Write a C program to find the roots of a Quadratic Equation.

 5.3) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using Switch…case.

**6. Control Flow- II**

 6.1) Write a C Program to Find Whether the Given Number is Prime number or not.

 6.2) Write a C Program to Find Whether the Given Number is Armstrong Number or not.

 6.3) Write a C program to print Floyd Triangle.

**7. Control Flow- III**

 7.1) Write a C program to find the sum of individual digits of a positive integer.

 7.2) Write a C program to check whether given number is palindrome or not.

 7.3) Write a C program to read two numbers, x and n, and then compute the sum of the geometric progression 1+x+x2 +x3 +………….+xn.

**Practice Programs:**

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| Write a C program to print all natural numbers from 1 to n. - using while loop |
| Write a C program to print all natural numbers in reverse (from n to 1). - using while loop |
| Write a C program to print all alphabets from a to z. - using while loop |
| Write a C program to print all even numbers between 1 to 100. - using while loop |
| Write a C program to print sum of all even numbers between 1 to n. |
| Write a C program to print sum of all odd numbers between 1 to n. |
| Write a C program to print table of any number. |
| Write a C program to find first and last digit of any number. |
| Write a C program to count number of digits in any number. |
| Write a C program to calculate sum of digits of any number. |
| Write a C program to calculate product of digits of any number. |
| Write a C program to swap first and last digits of any number. |
| Write a C program to enter any number and print its reverse. |
| Write a C program to enter any number and check whether the number is palindrome or not. |
| Write a C program to find frequency of each digit in a given integer. |
| Write a C program to enter any number and print it in words. |
| Write a C program to print all ASCII character with their values. |
| Write a C program to enter any number and print all factors of the number. |
| Write a C program to enter any number and calculate its factorial. |
| Write a C program to find HCF (GCD) of two numbers. |
| Write a C program to find LCM of two numbers. |
| Write a C program to check whether a number is Prime number or not. |
| Write a C program to check whether a number is Armstrong number or not. |
| Write a C program to check whether a number is Perfect number or not. |
| Write a C program to check whether a number is Strong number or not. |
| Write a C program to print Fibonacci series up to n terms. |

**8. Arrays**

 8.1) Write a C program to search an element in the given array (Linear Search).

 8.2) Write a C program to perform matrix addition.

 8.3) Write a C program to perform matrix multiplication.

**Practice Programs:**

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| Write a C program to read and print elements of array.  |
| Write a C program to find sum of all array elements. - using recursion. |
| Write a C program to find maximum and minimum element in an array. - using recursion. |
| Write a C program to find second largest element in an array. |
| Write a C program to copy all elements from an array to another array. |
| Write a C program to insert an element in an array. |
| Write a C program to delete an element from an array at specified position. |
| Write a C program to print all unique elements in the array. |
| Write a C program to print all negative elements in an array. |
| Write a C program to count total number of even and odd elements in an array. |
| Write a C program to count total number of negative elements in an array. |
| Write a C program to count total number of duplicate elements in an array. |
| Write a C program to delete all duplicate elements from an array. |
| Write a C program to count frequency of each element in an array. |
| Write a C program to merge two array to third array. |
| Write a C program to find reverse of an array. |
| Write a C program to convert lowercase string to uppercase. |
| Write a C program to convert uppercase string to lowercase. |
| Write a C program to toggle case of each character of a string. |
| Write a C program to find total number of alphabets, digits or special character in a string. |

**9. Pointers**

 9.1) Write a C Program to Perform Addition, Subtraction, Multiplication and Division of two
 numbers using Command line arguments.

 9.2) Write a C program to find sum of n elements entered by user. To perform this program,
 allocate memory dynamically using malloc () function.

 9.3) Write a C program to find sum of n elements entered by user. To perform this program,
 allocate memory dynamically using calloc () function.

**10. Functions, Array & Pointers**

 10.1) Write a C Program to demonstrate parameter passing in Functions.

 10.2) Write a C Program to find Fibonacci, Factorial of a number with Recursion and without
 recursion.

 10.3) Write a C Program to find the sum of given numbers with arrays and pointers.

**Practice Programs:**

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| Program to change the value of constant integer using pointers. |
| Program to print a string using pointer. |
| Program to count vowels and consonants in a string using pointer. |
| Program to read array elements and print with addresses. |

**11. Strings**

 11.1) Implementation of string manipulation operations with library function:

1. copy
2. concatenate
3. length
4. compare

 11.2) Implementation of string manipulation operations without library function:

1. copy
2. concatenate
3. length
4. compare

 11.3) Verify whether the given string is a palindrome or not.

**12. Structures**

 12.1) Write a C Program to Store Information of a book Using Structure.

 12.2) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function.

**13. Files**

 13.1) Write a C program to open a file and to print the contents of the file on screen.

 13.2) Write a C program to copy content of one file to another file.

 13.3) Write a C program to merge two files and store content in another file.

**14. Application**

 Creating structures to capture the student’s details save them in file in proper record format, search and prints the student details requested by the user.

**Note:** **Draw the flowcharts using Raptor from Experiment 3 to Experiment 6.**

**Course Outcomes:**

* Implement basic programs in C and design flowcharts in Raptor.
* Use Conditional and Iterative statements to solve real time scenarios in C.
* Implement the concept of Arrays and Modularity and Strings.
* Apply the Dynamic Memory Allocation functions using pointers.
* Develop programs using structures, and Files.

**Reference Books:**

1. Yashwanth Kanetkar, Let Us C,16th edition, BPB Publications.

2. Ajay Mittal, Programming in C A-Practial Approach, Pearson Education.

3. Dennis Richie and Brian Kernighan, The C programming Language, Pearson Education.

4. K Venugopal, Problem solving using C, 3rd Edition, TMG Publication.

**Web Links:**

1. https://www.hackerrank.com/

2. https://www.codechef.com/

3. https://www.topcoder.com/

4. https://code-cracker.github.io/

5. https://raptor.martincarlisle.com/

6. <https://nptel.ac.in/courses/106105085/2>