

Subject Code : 2CS2010102	Subject Title: FUNDAMENTALS OF PROGRAMMING
Pre-requisite:	- NONE -

Course Objective:

The objective of this course is to introduce to the students the basics of structured programming using C language. Students will become familiar with problem solving techniques and algorithm development.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				Total
Lecture	Tutorial	Practical	Credit	Theory		Practical		
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
4	-	3	7	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Introduction to programming & Basics of C Concepts of Algorithm and Flowcharts, Process of compilation, Generation of languages, Basic features of C Language like Identifier, Keywords, Variable, data types, Operators and Expression, Basic screen and keyboard I/O Control Statements Test Conditions, Conditional execution and selection, Iteration and Repetitive Executions, Nested loops	12	25
2	Arrays Introduction to contiguous data types, One dimensional array, multidimensional arrays, Array as strings, multidimensional character arrays, Operations on strings Functions Concept of modular programming, Using functions, Scope of data, Recursive function , Command line arguments.	12	25
3	Pointers Need of pointer, Types and uses of pointer, Array and Pointers, Pointers and strings, Pointer to Pointer, Pointers and functions, other aspect of pointers	7	15
4	User Defined Data Types Introduction to structure, usage of structure, nested structure, Union and its usage, Enumeration types, bit fields	7	15
5	Files Types of files, working with files, usage of file management functions Other features of C Bitwise operators and its usage, C Preprocessor statements	10	20

Course Outcome:

At the end of this course, the student would be able

- To have fundamental knowledge on flowcharts and algorithm
- To formulate the problem and express the same using flowcharts and algorithm
- To understand the basic terminology used in computer programming using C

- To Study, analyze and understand logical structure of a computer program, and different construct to develop a program in 'C' language
- To write, compile and debug programs in C language
- To design programs involving decision structures, loops and functions
- To design programs involving structure, pointer and file.

List of References:

1. Programming in C, Pradip Dey & Manas Ghosh, Publisher – Oxford
2. Programming in ANSI C – E Balagurusamy, TMH publication, latest Edition
3. Let us "C" – Kanetkar Yashwant, BPB Publication, Latest Edition.
4. Mastering C, Venugopal & Prasad, Publisher – Tata McGraw Hill

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

Sr. No.

Practical Exercise

1. **Draw a Flow chart and write an Algorithm for following Problems.**
 - 1.1 Write an algorithm and flowchart for calculating the difference, and the quotient the product of two given numbers.
 - 1.2 Write an algorithm and flowchart for converting centimeters to meters.
 - 1.3 Write an algorithm and flowchart for finding maximum from 3 numbers.
 - 1.4 Write an algorithm and flowchart for finding sum of N Numbers.
 - 1.5 Write an algorithm and flowchart for Solving Quadric Equation.
2. **Usage of Operators**
 - 2.1 Write a program to print "Hello World" message.
 - 2.2 Write a program to print Name, Address and Birth Date.
 - 2.3 Write a C Program that demonstrates implicit and explicit conversion.
 - 2.4 Write a C Program to swap two numbers.
 - 2.5 Write a C Program to make Simple Calculator.
 - 2.6 Write a program to add, multiply and divide two integers and float numbers.
 - 2.7 Write a program to accept number of days and print year, month and remaining days.
3. **Decision Making Statements**
 - 3.1 Write a C Program to find maximum and minimum of three numbers.
 - 3.2 Write a C Program to check given number is even or odd.
 - 3.3 Write a C Program to check whether year is leap year or not.
 - 3.4 Write a C Program to make choice based Simple Calculator.
 - 3.5 Write a C Program to find given number is negative, positive or zero.
 - 3.6 Write a C Program to demonstrate switch case statement.
4. **Looping Structures**
 - 4.1 Write a program to display multiplication table.
 - 4.2 Write a program to find sum of all integers greater than 100 & less than 200 and are Divisible by 5.
 - 4.3 Write a program to evaluate following series.
 - $1+2+3+4+5+\dots+N$
 - $1+3+5+7+\dots+N$
 - $1-2+3-4+5-3+\dots+N$
 - $1 + 1/2 + 1/3 + 1/4 + \dots + 1/N$

- $1^2 + 2^2 + 3^2 + \dots + N^2$

- 4.4 Write a C Program to find factorial numbers using Loop.
 4.5 Write a C Program to reverse given numbers.
 4.6 Write a C program to (a) count digits (b) find sum of digits of a given number.
 4.7 Write a C program to convert each digits of a number in words.
 4.8 Write a C program to print Fibonacci series of given range.
 4.9 Write a C program to prepare a currency converter.
 4.10 Write a c program to check given number is
- perfect number or not
 - Armstrong number or not
 - Prime number or not
 - Strong number or not
 - Odd or even
 - Palindrome number or not
- 4.11 Write a c program to print
- Floyd's triangle
 - Pascal triangle
 - Multiplication table
- 4.12 Write a C Program for following Patterns.

*	1 2 3 4 5	AAAAA	1
* *	2 3 4 5	BBBB	0 1
* * *	3 4 5	CCC	1 0 1
* * * *	4 5	DD	0 1 0 1
* * * * *	5	E	

5. Arrays

- 5.1 Write a C Program to make sum of 10 numbers using an Array.
 5.2 Write a C Program to find maximum of given array elements.
 5.3 Write a C Program to make addition of two arrays' elements.
 5.4 Write a C Program to scan and print two dimensional array elements.
 5.5 Write a C Program to search an element from an array.
 5.6 Write a C Program to sort array elements in ascending and descending order.
 5.7 Write a C Program to delete specific element from array.
 5.8 Write a C Program to make matrix multiplication of two 3*3 matrixes.

6. Functions

- 6.1 Write a C Program and make Function to Convert Fahrenheit to Celsius.
 6.2 Write a C Program and make Function to Find Sum and Average of three Numbers.
 6.3 Write a C Program and Make Function for each operation of Simple Calculator.
 6.4 Write a C Program and make recursive function for Factorial.
 6.5 Write a C Program and that demonstrate use of nesting of Function.
 6.6 Write a function prime that returns 1 if its argument is a prime no. and returns 0 otherwise.
 6.7 Write a program to add first n numbers.
 6.8 Write a function which returns 1 if the given number is palindrome otherwise returns 0.
 6.9 Write a function that will scan a character string passed as an argument and convert all lower-case character into their upper-case equivalent.
 6.10 Write a function to reverse the string.
 6.11 Write a program that search an item from array of string.

7. String

- 7.1 Write a program that will read a text and count all occurrences of a particular word.
 7.2 Write a program that will read a string and rewrite it in the alphabetical order. i.e. the word

STRING should be written as GINRST.

7.3 Write a program that appends the one string to another string.

7.4 Write a program that finds a given word in a string.

8. Structure

8.1 Define a structure called cricket that will describe the following information:

Player name
Team name
Batting average

Using cricket, declare an array player with 50 elements and write a program to read the information about all the 50 players and print a team-wise list containing names of player with their batting average.

8.2 In a program declare following structure member: name, code, age, weight and height. Read all members of the structure for 100 persons and find list of persons with all related data whose weight > 50 and height > 40 and print the same with suitable format and title.

9 Pointer

9.1 Write a program using pointers to read an array of integers and print its elements in reverse order.

9.2 Write a function to calculate the roots of the quadratic equation. The function must use two pointer parameters, one to receive the coefficients a, b, and c, and the other to send the roots to the calling function.

9.3 Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.

10 File

10.1 Write a program to read data from keyboard and write it to a file named STUDENT. Again read the same data from STUDENT file and write it into DATA file. Same data should be displayed on the screen.

10.2 Write a program which works like a COPY command.

10.3 Write a program which works like a TYPE command.