St. Xavier's College (Autonomous), Ahmedabad

Course is the part of Syllabus for Semester – II as per NEP, to be implemented from the Academic Year **2023-24.**

DEPARTMENT OF PHYSICS & ELECTRONICS

Skill Enhanced Course-2: Physics Analysis Using Language C 2 Cr 50 Marks

Course Code & Title	Credit Distribution of The Course				Eligibility Criteria	Prerequisite(s) of the Course
	Cr	Lecture	Lab	Activities		
SEC – 2650 Physics Analysis using C Programming	2	1Cr	1Cr	Solving Physics Related Problems With C	10+2 Science Stream Math-Group	None

Learning Objectives

In this course, students will learn:

1. The symbols and conventions used in flowchart diagrams.
2. Basic components of a C program, including header files, main function, and user-defined functions.
3. Variables and structures in C, concept of loop, calling libraries and executing programs on computer.
4. Continue and break statements in loop constructs, arrays and their role in storing multiple values of the same data type, declaration, initialization, reading, and writing of strings.
5. To apply the knowledge of C decision making loops, control statements and arrays for physics related scientific problems.

Learning Outcomes

On completion of this course, students will be able to:

1. Understand the history and significance of the C programming language in the development of modern computing.
2. Demonstrate the ability to create and interpret flowcharts as visual representations of algorithmic processes.

3. Illustrate and explain the basic computer concepts and programming principles of C language.
4. Write small programs using various C language statements.
5. To solve simple problems from physics and mathematics using C programming.

Unit: 1 Lectures **1Cr (15 Hours)**

(A) C Language Programming-1: Introduction to C, History about C, Flowcharts, Basic structure of a C program, Executing a C program, Keywords and identifiers, Variables, C operators, reading a character, writing a character, Formatted input, Formatted output, Decision making with if statements, Simple if statement, if-else statement, nesting of if-else statements, else if ladder, switch statements

(B) C Language Programming-2: Conditional operator, go to statement, While statement, do statement, do while, for statement, jumps in loops – continue and break statements Arrays, One dimensional arrays, declaration and initialization of arrays, two dimensional and multi dimensional array, Declaring and initializing string variables, reading and writing strings, arithmetic operations on characters, concatenation, comparing, copying and finding length of strings.

Unit: 2 Laboratory Component **1Cr (30 Hours)**

Laboratory exercises

1. Write a C program to simulate fluid flow in pipes, tanks, or other geometries. You can calculate parameters like flow rate, pressure drop, and velocity profiles.
2. Write a C program to solve problems related to optics, such as calculating the path of light rays through different optical elements, like lenses or mirrors.
3. C-Program to convert Binary to Decimal
4. C-Program to convert Binary to Hexadecimal
5. C-Program to convert Fahrenheit to Celsius
6. C-Program to convert the Electricity Bill
7. C-Program to convert Days into years, months, days
8. C-Program to Find mean, variance and standard deviation
9. Write a C program to find maximum height, total time and range of projectile motion.
10. Write code in C for vertically upward motion.
11. Write a C program for prime number, natural number, even or odd number.
12. Write a C program for Fibonacci number.

Reference Books:

1. Balagurusamy E: Programming in ANSI-C (Iind.Ed.)TMHpub.

2. Kernighan B.W and Ritchie D.K: C programming language, PH pub
3. Zed A. Shaw: Learn C The Hard Way, Zed Shaw's Hard Way Series
4. P.Day and M.Ghosh. Programming in C, Oxford University press,2007
5. Gottfried B.S. Programming with C 8. Kenetker Y. Let us C, BPB pub
6. David and Dawn Griffiths: Head First C, O' Reilly