SEC101	Problem Solving Techniques	L	T	P	C
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COURSE OBJECTIVES

- To learn the fundamentals of PST and methodologies which are essential for building good programs
- To help the students to learn programming concepts using C Language
- Design the solution from specification of a problem and write pseudo code of the algorithm using basic building blocks or structured programming constructs
- To demonstrate a thorough understanding of modular programming by designing programs which require the use of programmer-defined functions
- To impart the knowledge about pointers which is the backbone of effective memory handling and demonstrate adeptness of file access in developing solutions to problems

COURSE OUTCOMES

- Learn the fundamental programming concepts and methodologies, which are essential for building good programs.
- Able to translate an algorithm into program
- Understand the modular programming by designing programs, which require the use of control structures, arrays, defined functions and learn about storage classes
- Acquire the knowledge about pointers
- Obtain the knowledge of writing and testing programs

Unit I: Problems and Problem Instances

Types of Computational Problems- Classification of Problem- Analysis of Problems- Solution Approaches- Algorithm Development- Analysis of Algorithm - Role of Data Structures in Problem Solving- Problem Solving Steps-Modular Programming.

12 Hrs.

UNIT –II: C fundamentals:

Character set - Identifier and keywords - data types - constants- Variables - Declarations - Statements - Operators – Expressions – Built in functions – Input and Output Operations.

12 Hrs.

UNIT – III: Control Structure Statements and Arrays

Flow of control - if, if else, While, do-while, for loop, Nested control structures - Switch, break and continue, go to statement – Arrays.

12 Hrs.

UNIT – IV: Functions & Structure:

Definition - Prototypes – Passing arguments – Recursion- Storage Classes – Structure-Union.

12 Hrs.

UNIT – V: Pointers and File:

Declarations - Structures and Pointers - Passing pointers to Functions - Pointer and Arrays -Arrays of Pointers - Files: Creating, Processing, Opening and Closing a data file- Debugging.

12 Hrs.

Total Periods: 60

LIST OF EXPERIMENTS

1. Converting degrees Celsius to Fahrenheit and vice versa?
2. Write a Program to generate a Fibonacci Series
3. Given a positive integer value n (>= 0) display number, square and cube of numbers from 1 to n in a tabular format?
4. Given an input positive integer number, display odd numbers from in the range [1,n]?
5. Compute character grade from the marks ($0 \leq$ marks ≤ 100) of a subject. Grading Scheme: 80-100: A, 60 - 79: B, 50 - 59: C, 40-49: D, 0-39: F? Solve this using switch case
6. Display following patterns of n rows (n > 0), For the below examples n = 5?

```
$
$$
$$$
$$$$
$$$$$
```

7. Check if a given positive integer number is a palindrome or not?
8. Implement your own string length and string reversal functions?
9. Write a Program to sort an array.
10. Write a Program to find the factorial of an integer using recursion.
11. Write a Program to swap two values using function pointer.
12. Write a Program to store student's information using Structure.
13. Write a Program to perform read and write operation on a file.

TEXT BOOKS

1. Venkatesh, Nagaraju Y, "Practical C Programming for Problem Solving", Khanna Book Publishing Company, 2024.
2. R.S.Salaria, Programming for Problem Solving (with Lab Manual), Khanna Book Publishing Company, 1st Edition, 2024.
3. Harvey Deitel and Paul Deitel, "C How to Program", Pearson India, 9th Edition, 2015.
4. R G Dromey, "How to Solve It by Computer", Pearson India, 2007.

REFERENCE BOOKS

1. Brian W. Kernighan and Dennis Ritchie, "The C Programming Language", Pearson, 2nd Edition, 2015.

E- REFERENCES

1. https://practice.geeksforgeeks.org/explore/?category[]=C-Programming-Language
2. https://www.codechef.com/practice
3. https://leetcode.com/problemset/all/
4. https://exercism.org/tracks/c