Problem Solving Techniques

Course Code	20ES1103	**Year**	I	**Semester**	I
Course Category	Engineering Science	**Branch**	CSE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Nil
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	Understand the fundamental concepts of computers, algorithms, flowcharts and problem solving techniques. (L2)
CO2	Apply the basic knowledge of mathematical factoring methods to model an algorithm, flowchart for a given problem. (L3)
CO3	Apply merging, sorting, searching, text processing techniques to develop algorithms.(L3)
CO4	Analyze the given problem, use appropriate array technique and write an effective report. (L4)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2	1									1				
CO3													3	
CO4		2							1	1				

Syllabus

Unit No.	Syllabus	Mapped CO_s
1	**Introduction:** Components of a Computer System, Introduction to Algorithms and Flowcharts. Fundamental Algorithms: Exchanging the values of two variables, Counting, Summation of a set of numbers, Factorial Computation, Generation of Fibonacci sequence, Reversing the digits of an integer.	CO1, CO2
2	**Factoring Methods:** Finding the square root of a number, smallest divisor of an integer, Greatest common divisor of two integers, Generating prime numbers, Computing Prime Factors of an integer, generation of pseudo random numbers, raising a number to a large power, computing nth Fibonacci number	CO1, CO2
3	**Array Techniques:** Array order reversal, Array counting or Histogramming, finding the maximum number in a set, removal of duplicates from an ordered array, partitioning an array, finding the kth smallest element	CO1, CO3`
4	**Merging, Sorting and Searching:** The two-way merge, sorting by selection, sorting by exchange, sorting by Insertion, Linear search, binary search.	CO1, CO3, CO4
5	**Text Processing and Pattern Searching:** Keyword searching in text, Text line editing, Linear pattern search, Sublinear pattern search.	CO1, CO3, CO4

Learning Resources
Text Books
1. How to Solve it by Computer, R.G. Dromey, First Edition, 2006, Pearson
Reference Books

1. Fundamentals of Computers, Reema Thareja, Oxford University Press.
   2. Flowchart and Algorithm Basics: The Art of Programming, A B Chaudhuri, 2020, Mercury Learning and Information.
   3. Algorithms Unlocked, Thomas H. Coremen, 2013, The MIT Press.
   4. An Introduction to Programming and Problem Solving with Pascal, Michael Schneider, Steven W. Weingart, David M. Perlman, Second Edition, 2011, Wiley India

e- Resources & other digital material

1. https://onlinecourses.swayam2.ac.in/nou20_cs03/preview
   2. https://www.coursera.org/learn/problem-solving?#about
   3. https://www.udemy.com/course/flowchartingcourse/
   4. https://raptor.martincarlisle.com/