

COMPUTATIONAL THINKING
(Minor in CSE)

Course Code	23CS5401	Year	II	Semester	II
Course Category	Minor	Branch	Other branches	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	NIL
Continuous 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 searching, sorting and data processing over numerical and textual data.	L2
CO2	Apply the knowledge of fundamental algorithms and factoring methods to model a flowchart for a given problem.	L3
CO3	Apply the concepts of data processing techniques to develop algorithms for a given problem.	L3
CO4	Analyze the given problem to develop an efficient solution using sorting or pattern searching techniques.	L4

Syllabus		
Unit No.	Contents	Mapped CO
I	<p>Introduction to computational thinking: What is computational thinking, Pillars of computational thinking - Decomposition, Pattern Recognition, Data Representation and Abstraction, Algorithm Design. Introduction to Algorithms and Flowcharts.</p> <p>Fundamental Algorithms: Exchanging the values of two variables, Counting, Factorial Computation, Generation of Fibonacci sequence, Reversing the digits of an integer.</p>	CO1, CO2
II	<p>Factoring Methods: Finding the square root of a number, smallest divisor of an integer, Greatest common divisor of two integers, Computing Prime Factors of an integer, Generation of pseudo random numbers.</p>	CO1, CO2
III	<p>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.</p>	CO1, CO3
IV	<p>Merging, Sorting and Searching: The two-way merge, sorting by selection, sorting by exchange, sorting by Insertion, Linear search, binary search.</p>	CO1, CO3, CO4
V	<p>Text Processing and Pattern Searching: Keyword searching in text, Text line editing, Linear pattern search, Sub linear pattern search.</p>	CO1, CO3, CO4

Learning Resources	
Text Books	1. How to Solve it by Computer, R.G. Dromey, First Edition, Pearson, 2006.
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. Cormen, 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/ 5. https://www.coursera.org/learn/computational-thinking-problem-solving