

COMPUTATIONAL THINKING

Course Code	20CS5401	Year	II	Semester	II
Course Category	Minor	Branch	Other branches	Course Type	Theory
Credits	4	L-T-P	4-0-0	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

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: Substantial, 2: Moderate, 1: Slight)

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

Syllabus		
Unit No.	Contents	Mapped CO
I	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, 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
II	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
III	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
IV	Merging, Sorting and Searching: The two-way merge, sorting by selection, sorting by exchange, sorting by Insertion, Linear search, binary search.	CO1, CO3, CO4
V	Text Processing and Pattern Searching: Keyword searching in text, Text line editing, Linear pattern search, Sub linear pattern search.	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/