

Prerequisites: Nil

Course Objectives

- This course provides the foundations of computational problem solving.
- The course focuses on principles and methods thereby providing transferable skills to any other domain.
- The course also provides foundation for developing computational perspectives of one's own discipline.

Course Outcomes

CO1: Apply algorithmic thinking to understand, define and solve problems

CO2: Design and implement algorithm(s) for a given problem

CO3: Apply the basic programming constructs for problem solving

CO4: Understand an algorithm by tracing its computational states, identifying bugs and correcting them.

CO-PO Mapping

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

Syllabus

Unit 1

Problem Solving and Algorithmic Thinking Overview – problem definition, logical reasoning; Algorithm – definition, practical examples, properties, representation, algorithms vs programs.

Unit 2

Algorithmic thinking – Constituents of algorithms – Sequence, Selection and Repetition, input-output; Computation – expressions, logic; algorithms vs programs, Problem Understanding and Analysis – problem definition, input-output, variables, name binding, data organization: lists, arrays. Algorithms to programs.

Unit 3

Problem solving with algorithms – Searching and Sorting, Evaluating algorithms, modularization, recursion. C for problem solving – Introduction, structure of C programs, data types, data input, output statements, control structures.

Text Book

Riley DD, Hunt KA. Computational Thinking for the Modern Problem Solver. CRC press; 2014 Mar 27.

Reference(s)

1. *Ferragina P, Luccio F. Computational Thinking: First Algorithms, Then Code. Springer; 2018.*
2. *Beecher K. Computational Thinking: A beginner's guide to Problem-solving and Programming. BCS Learning & Development Limited; 2017.*
3. *Curzon P, McOwan PW. The Power of Computational Thinking: Games, Magic and Puzzles to help you become a computational thinker. World Scientific Publishing Company; 2017.*

Evaluation Pattern

Assessment	Internal	External
Periodical 1	10	
Periodical 2	10	
Continuous Assessment (Theory) (CAT)	15	
Continuous Assessment (Lab) (CAL)	30	
End Semester		35

*CA – Can be Quizzes, Assignment, Projects, and Reports.