Competitive Programming	L	T	P	Data Structures, C/C++
	3	1/0	0/2	

Course Objective: To equip students with the skill to think critically and logically to solve any problem.

S. NO	Course Outcomes (CO)
CO1	To understand the different data structures as per the need of the problem statement
CO2	To understand the basic and advanced level maths behind different algorithms

CO3	To apply dynamic programming techniques with different data structures
CO4	To efficiently retrieve and manipulate elements within a specified range in a data structure

S. NO	Contents	Contact Hours
UNIT 1	Number Theory and Bit Manipulation: Binary Exponentiation Modular Arithmetic, Modular Inverse, Euclidean: GCD, Euclidean: LCM, Sieve of Eratosthenes, Linear Diophantine Equation with Two Variables, Chinese Remainder Theorem, Bit operations	**10**
UNIT 2	Combinatorics and Greedy Algorithms: Stars and Bars Factorial, Binomial Coefficient (nCr), Catalan Number, Two Pointer Sliding Window	**8**
UNIT 3	Searching Techniques and algorithms: Binary Search on answer and monotonic functions, Ternary Search on Convex Functions	**8**
UNIT 4	Dynamic Programming: DP on arrays, Dp on trees, Dp on directed graph, Game DP, Digit Dp, Dp with Bitmasking	**8**
UNIT 5	Range Queries: Segment tree Sparse table, Fenwick tree, Lazy Propagation, Square root decomposition (MO's Algorithm).	**8**
	TOTAL	**42**

REFERENCES

S.No.	Name of Books/Authors/Publishers	Year of Publication /