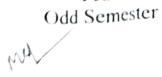
PRANVEER SINGH INSTITUTE OF TECHNOLOGY, KANPUR Session 2023-24

Session 2023-24

CT -I



B. Tech. 3rd Semester

Data Structure (BCS 301)

Course Outcomes				
CO Number	Define [L1:Remember] facts, terms and basic concepts of various data Define [L1:Remember] facts, terms and basic concepts of various data			
COI	Define [L1:Remember] facts, terms and basic concepts of various data Define [L1:Remember] facts, terms and basic concepts of various data Structures like Array, List, Stack, Queue, Tree and Graph using C as the			
	structures like Array, List, Stack, Queuc, Tree and Graph using C as the structures like Array, List, Stack, Queuc, Tree and Graph using C as the programming language with static or dynamic implementations. programming language with static or dynamic implementations.			
	programming language with static of dynamic implementations. Express [L2:Understand] the basic understanding using programming Express [L2:Understand] the basic understanding using programming in the station of problems.			
CO2	Express [L2:Understand] the standard for Express [L2:Understand] the standard			
	techniques for illustrating solution of problems. Employ [L3:Apply] different operations on data structures by applying			
CO3				
	knowledge and facts gained. Analyze [L4:Analysis] the performance of data structures and algorithms to			
CO4	Analyze [L4:Analysis] the performance of data structure solve problems and also to draw conclusions regarding the best data structure			
	solve problems and also to draw conclusions regarding the best data structure			
	for the problem.			

,	Time: 1.5 Hrs.	M. M. 20				
Q1. A(a) b) c) d)	Section A ttempt all questions: Define Data Structure. Describe the Big-Oh (O) notation to represent time and space complexity. Examine $n^3 + 2n^2 + 5 \neq O(n^2)$. Describe the representation of 2-Dimensional array in memory. Underline the features of algorithm.		CO1 CO2 CO4 CO2 CO1			
Section B						
Q2. Attempt all questions: (2.5X4 = 10 Ma			larks)			
a i)	Explain about multi-dimensional array. Consider a multi-dimensional Array A[-10:9, 5:14, -3:6] with base address start at 1000. Calculate the address of A[5][10][2] in row major and column major order. Assume the each element take 4 Bytes. Or					
ii)	Demonstrate binary search Algorithm and use it to find item 35 in the sorted 11, 13, 20, 22, 33, 35, 49, and 52. Also write the complexity of binary search	array: 2, 9, in all cases.	CO2			
bi)	Define the various asymptotic notations with examples.		CO1			
ii)	Or Define the function in C language for Linear Search and also write its compasses.	lexity in all	CO1			
c i)	Apply Selection sort algorithm to sort given elements 23, 10, 16, 7, 81, 13a	nd 20. Also,	CO3			

Ω3	$\frac{\text{Section C}}{\text{(5X1 = 5 M)}}$	(arks)
ii)	Analyze run-time complexity of Bubble sort algorithm in all cases.	CO4
d i)	Analyze run-time complexity of insertion sort algorithm in all cases. Or	CO4
ii)	Or Apply counting sort algorithm to sort given elements 5, 3, 5, 3, 4, 1, 3, 8 and 4. Also, write the complexity of counting sort algorithm.	CO3
	write the run-time complexity of selection sort algorithm.	

CO₃ Apply quick sort algorithm to sort given array A [3, 8, 6, 2, 15, 7, 12]. Also, write quick sort algorithm and explain its run-time complexity. Or CO₃

Apply merge sort algorithm to sort given array A[11, 10, 3, 6, 12, 18, 16, 13]. Also, write

merge sort algorithm and explain its run-time complexity.

ii)