

OLMCA503	Data Structures and Algorithms	L	T	P	C
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Pre-requisite	NIL	Syllabus version			
		1.0			
Course Objectives:					
1. To choose appropriate data structures for application development					
2. To understand algorithm design techniques and time complexity.					
3. To deploy algorithms in real time applications.					
Course Outcomes:					
1. Calculate to find the time and space complexities of various algorithms.					
2. Choose appropriate data structure as applied to specified problem definition.					
3. Handle operations like searching, insertion, deletion and traversing mechanism on various data structures.					
4. Use linear and non-linear data structures.					
5. Solve problems using data structures.					
6. Apply concepts learned in various domains.					
Module:1	Algorithm Design Techniques				
Asymptotic notations, Time complexity - Master Theorem, recurrence relation, Divide and Conquer technique, Dynamic programming, Backtracking, Greedy Algorithms.					
Module:2	Stacks and Queues				
Stacks and its Applications, Queue and its applications, Priority Queues.					
Module:3	Linked Lists				
Singly linked lists, Doubly linked lists, Circular linked lists, Applications of linked lists.					
Module:4	Sorting and Searching				
Insertion sort, Shell sort, Quick sort, Heap sort, Merge sort, Radix sort, Binary Search, Hash Search.					
Module:5	Trees				
General Tree to Binary Tree, Tree Traversals, Binary Search Trees, AVL Trees, B-Trees, Huffman coding.					
Module:6	Graphs				
Graph Traversals, Dijkstra's algorithm, All pairs shortest path, Minimum Spanning Tree, Biconnectivity.Default Arguments, Recursive Functions.					
Module:7	More Data Structures				
Sets, Dictionaries, Binomial queues, Online algorithms, Machine learning algorithms.					
	Total Lecture hours:				120 hours
Text Book(s)					
1. Mark Allen Weiss,“Data structures and algorithm analysis in C++”, 2019, 4th edition, Pearson Education ,Delhi.					
Reference Books					
1. Cormen, T.H., Leiserson, C.D., Rivest, R.L. & Stein, C. “Introduction to Algorithms” 2009, Third Edition. MIT Press USA.					
2 J.P. Tremblay and P.G. Sorenson, “An Introduction to Data Structures with applications”, 2017, Second Edition, Tata Mc GrawHill., New Delhi.					
3. Jon Krohn. ” Data Structures, Algorithms, and Machine Learning Optimization”, 2021, Addison-Wesley Professional.					
Mode of Evaluation: Quiz / Assignment / Mid-Term, FAT					
Recommended by Board of Studies				15.11.2021	
Approved by Academic Council				No. 64	Date 16-12-2021