

ST. ANN'S COLLEGE OF ENGINEERING & TECHNOLOGY, CHIRALA
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
LESSON PLAN

Subject: Data Structures Through C++
Name: G. Prasuna

Academic Year: 2019 – 2020
Year &Sem/Section: II -I 'A'

Unit No.	Topics Planned to be Covered	No. of Periods Required
I	ARRAYS: Abstract Data Types and theC++Class, An Introduction to C++ Class, Data Abstraction and Encapsulation in C++,Declaring Class Objects and Invoking Member Functions, Special Class Operations, Miscellaneous Topics-ADTs and C++Classes, The Array as an Abstract Data Type, The Polynomial Abstract Datatype-Polynomial Representation- Polynomial Addition. Sparse Matrices, Introduction- Sparse Matrix Representation- Transposing a Matrix- Matrix Multiplication, Representation of Arrays.	11
II	STACKS AND QUEUES: Templates in C++, Template Functions-Using Templates to Represent Container Classes, The Stack Abstract Data Type, The Queue Abstract Data Type, Subtyping and Inheritance in C++, Evaluation of Expressions, Expression-Postfix Notation-Infix to Postfix.	11
III	LINKED LISTS: Single Linked List and Chains, Representing Chains in C++, Defining a Node in C++, Designing a Chain Class in C++,Pointer manipulation in C++, Chain Manipulation Operations, The Template Class Chain, Implementing Chains with Templates-Chain Iterators –Chain Operations- Reusing a Class, Circular Lists, Available Space Lists, Linked Stacks and Queues, Polynomials, Polynomial Representation- Adding Polynomials- CircularList Representation of Polynomials, Equivalence Classes, Sparse Matrices, Sparse Matrix Representation- Sparse Matrix Input- Deleting a Sparse Matrix, Doubly Linked Lists, Generalized Lists, Representation of Generalized Lists-Recursive Algorithms for Lists-Reference Counts, Shared and RecursiveLists	12
IV	TREES: Introduction, Terminology, Representation of Trees, Binary Trees, The Abstract Data Type, Properties of Binary Tress, Binary Tree Representations, Binary Tree Traversal and Tree Iterators, Introduction, Inorder Traversal Preorder Traversal, Postorder Traversal, Thread Binary Trees, Threads, Inorder Traversal of a Threaded Binary Tree, Inserting a Node into a Threaded Binary Tree, Heaps, Priority Queues, Definition of a MaxHeap, Insertion into a MaxHeap, Deletion from a MaxHeap, Binary Search Trees, Definition, Searching a Binary Search Tree, Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree.	14
V	GRAPHS: The Graph Abstract DataType, Introduction, Definition, Graph Representation, Elementary Graph Operation, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Biconnected Components, Minimum Cost Spanning Trees, Kruskal's Algorithm, Prims Algorithm, Sollin' s Algorithm, Shortest Paths and Transitive Closure, Single Source/All Destination: Nonnegative EdgeCost, Single Source/All Destination: General Weights, All-Pairs Shortest Path, Transitive Closure.	12
VI	SORTING: Insertion Sort, Quick Sort, MergeSort Merging, Iterative Merge Sort, Recursive MergeSort, Heap Sort.	5
	Total Number of Periods Required	65

TEXT BOOKS:

- 1.Fundamentals of DataStructures in C++,Ellis Horowitz, Sartaj Sahni and Dinesh Mehta,2nd Edition, Universities Press(India) Pvt. Ltd.
- 2.Datastructures and Algorithm Analysis in C++,AllenWeiss,PearsonEducationLtd., Second Edition.
- 3.Datastructures and Algorithms in C++, Michael T.Goodrich, R.Tamassi and Mount, Wiley student edition,J ohnWiley and Sons.

REFERENCE BOOKS:

1. Datastructures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson.
2. Datastructures using Cand C++,Langsam, Augensteinand Tanenbaum, PHI.
3. Problem solvingwith C++, TheOOP,Fourth edition, W.Savitch, Pearson education.

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