Syllabus for 1st Sem MTech CSE
ADVANCED DATA STRUCTURE LAB
(LABORATORY)

	ADVANCED DATA STRUCTURE LAB
	Credits: 2 (0-0-2)
Pre-requisite for this course:	**UG level course in Data Structures**
Course Objective:	• This course concentrates on the practical part of the course of Advanced Data Structure using C/C++ Programming Language. This course allows students to understand practically the Logical and physical representation of data, algorithms, complexity and efficiency, data Structure operations. • Data structures are fundamental building blocks of algorithms and programs **Course Objective:** • CO1: To be familiar with good programming design methods, particularly Top-Down design to solve all sorts of complicated problems. • CO2: To understand the study of the Topics related to courses like "Principles of Programming Languages", "programming methodologies", and "design & analysis of algorithms" through knowledge of Data Structures. • CO3: To develop algorithms for manipulating stacks, queues, linked lists, trees, and graphs, Hashing Techniques, searching and sorting. • CO4: To develop recursive algorithms as they apply to trees and graphs. • CO5: To be familiar with the issues of Time complexity and examine various algorithms from this perspective. • CO6: To be familiar the student with the concepts and help in mastering their applications in real software projects.
Course Outcome:	Upon successful completion of this course, the student should learn: • understand the importance of structure and abstract data type, and their basic usability in different applications through different programming languages. • analyze and differentiate different algorithms based on their time complexity. • understand the linked implementation, and its uses both in linear and non-linear data structure. • understand various data structure such as stacks, queues, trees, graphs, etc. to solve various computing problems. • implement various kinds of searching and sorting techniques, and know when to choose which technique. • decide a suitable data structure and algorithm to solve a real world problem.

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Experiment No. 1	a. Write a program that use both recursive and non recursive functions to perform the Binary search operation for a Key value in a given list of integers. b. Write a programs that implement Quick Sort, Merge Sort and Heap Sort method to sort a given list of integers in ascending order. c. Write a programs that implement Quick Sort by taking median as the pivot element to sort a given list of integers in ascending order.
Experiment No. 2	Write a program that uses functions to perform the following operations on Binary Search Tree: i) Creation ii) Insertion iii) Deletion iv) Traversal (Inorder, Preorder, Postorder)
Experiment No. 3	Write a program that uses Stack operations to perform the following: a. Converting infix expression into postfix expression b. Evaluating the postfix expression.
Experiment No. 4	a. Write a program that uses functions to perform the insert and delete operations on an AVL Tree. **b.** Write a program that uses functions to perform the insert and delete operations on a B-Tree.
Experiment No. 5	a. Write a program to generate a graph given in Simple Interaction Format(SIF). b. Find single source shortest path (given a source) using Dijkstra algorithm. c. Find all pair shortest path using Floyd Warshall algorithm.
Experiment No. 6	Write a program to find minimum spanning tree using following algorithm from a graph given in SIF format. a) Prim's **b)** Kruskal
Experiment No. 7	Write a program to encode data in a text file using Huffman coding.
Experiment No. 8	Write a program to find longest common subsequence and all common subsequence between pair of string.
Experiment No. 9	Write a program to implement Knuth-Morris-Pratt Algorithm and Rabin-Karp Fingerprinting Algorithm.
Experiment No. 10	Write a program to multiply two matrices using Strassen's algorithm.
Suggested Books:	1. Thomas H. Cormen, Charles E. Leiserson, R.L. Rivest.. Introduction to Algorithms, Prentice Hall of India Publications. 2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004. 3. Pai: "Data Structures & Algorithms; Concepts, Techniques & Algorithms "Tata McGraw Hill. 4. "Fundamentals of data structure in C" Horowitz, Sahani& Freed, Computer Science Press.
Evaluation:	1. Continuous Evaluation: 70% 2. End Term Assessment: 30%