PPE DATA STRUCTURES USING OBJECT ORIENTED PROGRAMMING

L	T	P	Cr
3	0	2	4.0

Course Objectives: To learn about programming concepts, various data structures, searching nd sorting of data techniques**,**

JECT ORIENTED PROGRAMMING: Overview of C++; Structures, Class Scope and Accessing Class Members, Reference Variabl ialization, Member Functions and Classes , Dyynamic Memory Allocation, Overloading: Function overloading and Operator Overloading

INHERITANCE & POLYMORPHISM : Base Classes and Derived Classes, Protected Members , Casting Class pointers and Mem Functions , Overriding , Public, Protected and Private Inheritance , Constructors and Destructors in derived Classes , Implicit Derived , C ect To Base ,Class Object Conversion ,Composition Vs. Inheritance , Virtual functions , Pointer

INEAR DATA STRUCTURES: Arrays, Records, Strings and string processing, References and aliasing, Linked lists, Strategies choosing the appropriate data structure, Abstract data types and their implementation: Stacks, Queues, Priority queues, Sets, Maps.

is Analysis: Differences among best, expected, and worst case behaviours of an algorithm, Asymptotic analysis of upper and expec complexity bounds, Big O notation: formal definition and use, Little o, big omega and big theta notation, Complexity classes, such as const arithmic, linear, quadratic, and exponential, Time and space trade-offs in algorithms, Recurrence relations, Analysis of iterative ursive algorithms.

ARCHING AND SORTING: Linear Search, Binary Search, Bubble Sort, Selection Sort, Insertion Sort, Shell Sort, Quick Sort, Heap Sor rge Sort, Counting Sort, Radix Sort.

GORITHMIC STRATEGIES WITH EXAMPLES AND PROBLEM SOLVING: Brute-force algorithms with examples, Gree orithms with examples, Divide-and-conquer algorithms with examples, Recursive backtracking, Dynamic Programming with exampl anch-and-bound with examples, Heuristics, Reduction: transform-and-conquer with examples.

N-LINEAR DATA STRUCTURES AND SORTING ALGORITHMS: Hash tables, including strategies for avoiding and resolv isions , Binary search trees, Common operations on binary search trees such as select min, max, insert, delete, iterate over tree, Graphs aph algorithms, Representations of graphs, Depth- and breadth-first traversals, Heaps, Graphs and graph algorithms, Shortest-path algorithm kstra and Floyd), Minimum spanning tree (Prim and Kruskal).

OBLEM CLAUSES: P, NP, NP- Hard and NP-complete, deterministic and non-deterministic polynomial time algorithm approximat

and algorithm for some NP complete problems. Introduction to parallel algorithms, Genetic algorithms, intelligent algorithms.

BORATORY WORK: Implementation of Arrays, Recursion, Stacks, Queues, Lists, Binary trees, Sorting techniques, Searching hniques. Implementation of all the algorithmic techniques.

commended Books

1. *Corman, Leiserson & Rivest, Introduction to Algorithms, MIT Press (2009), 3rd ed.*
2. *Langsam, Y. and Augenstein, M.J., Data Structures Using C and C++, Dorling Kindersley, 2008, 2nd ed.*
3. *Trembley, J.P., Sorenson, P.G., An introduction to data structures with applications, Tata McGraw Hill, 2008, 2nd ed.*
4. *Sahni, Sartaj, Data Structures, Algorithms and Applications in C++, Universities Press 2005, 2nd ed.*

valuation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1.	MST (Lab simulation)	10
2.	EST	35
3.	Sessionals (May include Assignments/Projects/Tutorials/Quizes etc.)	40