Timeline:

Week - 1	**Introduction to Data Structures/ Number Theory** ● Definition of data structures and abstract data types, ● Static and Dynamic implementations, Examples and real life applications; ● Searching Algorithms: Straight Sequential Search, Binary Search, Tertiary Search. ● Number theory and Mathematical Problems, based on base conversions, prime number and sieve, Divisibility and large numbers, Catalan numbers etc.
Week - 2 and 3	**Recursion and structures/classes** ● Introduction to recursion, Divide and Conquer Algorithm. ● Euler trees formation, and system-stack memory diagrams formations for recursive functions. ● Infix, postfix, prefix representation using recursion, Conversions, Applications. ● Introduction to structures and classes. And an introductory level of OOPS.
Week - 4	**Queues, Lists and Stacks** ● Definition and Array based implementation of Queues / Lists. ● Linked List implementation of Queues / Lists, ● The Stacks : Definition, Array based implementation of stacks, Linked List based implementation of stacks, ● Circular implementation of Queues and Singly linked Lists, ● Straight / circular implementation of doubly linked Queues / Lists, ● Priority Queues, Applications.
Week - 5	**Running Time and Bit Manipulation** ● e, AveTime Complexity and Big-oh-notation, ● Running Times, Best case, worst casrage Case, ● Factors depends on running time, ● Evaluating Time Complexity for recursive functions. ● Bit Manipulation: Introduction to bits and binary number system, and applications of bit ● Bitwise operators and logical operators using bits. ● Tricks and tips with bits, and important tactics.
Week - 6	**Searching and Sorting**

	● Introduction, Searching Algorithms: Straight Sequential Search, Binary Search ● Sorting by exchange, selection, insertions : Bubble sort, Selection sort, Efficiency of these algorithms; ● Shell sort, Performance of shell sort, ● Merge sort, Merging of sorted arrays & Algorithms; ● Quick sort Algorithm analysis, ● sortHeap: Heap Construction, Heap sort, bottom – up, Top – down Heap sort approach.
Week - 7 and 8	**Trees** ● Definition of generic trees and Binary trees, ● Properties of Binary trees and generic trees, and their Implementation, ● Tree Traversal pre-order, post order, In- order traversal, ● Binary Searching over the trees. ● Heaps and their equivalence structure with trees, ● AVL Trees, ● Implementations of the above
Week - 8 and 9	**Graphs** ● Definition of Undirected and Directed Graphs and Networks, ● The Array based implementation of graphs, ● Adjacency matrix and Adjacency list ● The Linked List representation of graphs, ● Graph Traversal – Breadth first Traversal, Depth first Traversal, ● Shortest path Algorithm, Examples: Dijkstra, Floyd Warshall and Bellman Ford. ● Minimum spanning trees, Examples: Prims and Kruskal +algorithm. ● Tables : Definition, Hash functions, ● Implementations and Applications of the above.
Week - 10 onwards	**Project Development Phase Started:** ● Project Functioning and Strategy discussion ● Dividing the tasks, among the participants.
After the project, only if we still have time.	**Dynamic Programming** ● DP: Introduction to dynamic programming, overlapping subproblems and optimal substructures. ● Approaches for dynamic programming: Memoization and Tabulation techniques.