Data Structures And Algorithms - Video course

Data Structures
Course objective: The objective of the course is to familiarize students with basic data structures and their use in fundamental algorithms.

Course contents:
Introduction to object oriented programming through stacks, queues and linked lists.
Dictionaries: skip-lists, hashing, analysis of collision resolution techniques.
Trees, traversals, binary search trees, optimal and average BST’s, 2-4 trees and red-black trees. Tries and pattern matching.
Priority queues and binary heaps. Sorting: merge, quick, radix, selection, heap.
Graphs, Breadth first search and connected components. Depth first search in directed and undirected graphs and strongly connected components.
Spanning trees: Prim’s and Kruskal’s algorithm, union-find data structure. Dijkstra’s algorithm for shortest paths, shortest path tree.
Directed acyclic graphs: topological sort and longest path.

Lecture outline with topics | no. of lectures
--- | ---
Introduction to object oriented programming through stacks, queues and linked lists | 4
Dictionaries: skip-lists, hashing, analysis of collision resolution techniques | 5
Trees, traversals, binary search trees, optimal and average BST’s, 2-4 trees and red-black trees | 6
Tries and pattern matching, Priority queues and binary heaps | 4
Sorting: merge, quick, radix, selection, heap | 5
Introduction to Graphs, Breadth first search and connected components | 3
Depth first search in directed and undirected graphs and strongly connected components | 3
Spanning trees: Prim’s and Kruskal’s algorithm, union-find datastructure | 4
Dijkstra's algorithm for shortest path, shortest path tree, Shortest and longest paths in directed acyclic graphs | 5