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 Trees, traversals, binary search trees, optimal and average BST's trees and red-black trees	5 6 4
Tries and pattern matching. Priority queues and binary heaps	5
Sorting: merge, quick, radix, selection, heap	3
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

NP-TEL

NPTEL

http://nptel.ac.in

Computer Science and Engineering

Coordinators:

Prof. Naveen Garg
Department of Computer Science and EngineeringIIT Delhi