CS602
Algorithms
July – December
2013

Dept. of Computer Science & Engineering

AVVP, Amritapuri Campus

Instructor : Sandhya Harikumar

Room : N115

Email : sandhyaharikumar@am.amrita.edu

Week 1	L1	Intro to Asymptotic notation and Recurrences
	L2-L3	Substitution, iteration and recursion. Master's theorem
	L4	Recurrences…
Week 2	L5	Intro: Sorting and searching. Insertion sort, bubble sort, counting inversions in a permutation.
	L6	Quiz 1.
	L7	D and C in sorting and searching: Quick sort, merge sort, binary search.
Week 3	L8-L9	D and C: Linear time median, Strassen's matrix multiplication.
Week 4	L10	Quiz 2.
	L11-12	Tutorial: weeks 1-3.
Week 5	L13	Introduction to graphs (undirected, directed, hand shake theorem, bi-partite graphs, cliques, star graphs, DAGs, n Dim cube)
		Midterm-I
Week 5	L14-15	BFS, DFS. Applications of BFS and DFS. Classification of edges.
Week 6	L16-17	Identification of Strongly Connected Components. Topological sort.
	L18	Quiz 3.
Week 7	L19-20	Tutorial: Weeks 5-7
	L21-22	Introduction to Greedy technique. Activity selection. Fractional knapsack.
Week 8	L23-24	MST: Cut, light edge. Prim's algorithm.

Week 9	L25	Kruskal's algorithm. Applications.
	L26-27	Single Source SP, Dijkstra's algorithm.
		Single Source SP: Bellman Ford.
Week 10	L28-29	Dynamic programming. All Pairs SP: Floyd-Warshall algorithm.
		Transitive closure of a graph. LC-substring.
Week 11	L31	Tutorial: weeks 8-11
	L32	Quiz 4
		Midterm-II
Week 11	L33-34	LC-subsequence, Matrix chain multiplication, 0-1 Knapsack. (Time permitting: Bitonic TSP, Box stacking problem : maximize height for l≥b ≥h).
Week 12-13	L35	Flow Networks. Max-flow Min-cut theorem.
	L36-39	Ford-Fulkerson.
		Problems related to flow networks. Max. bipartite matching
Week 14	L40-41	Introduction to NP-Completeness. P, NP, NP-hard, NP-complete. Polynomial time reductions. 3CNF-SAT to Clique. VC to Clique.
	L42	Quiz 5
Week 15	L43-45	Approximation algorithms. Vertex cover, TSP with triangle inequality.
Week 16		Other topics of interest as per the time and instructors interest. These topics are not to be included in the final exam. E.g. string matching algorithms, advanced data structures, Randomized algorithms.
		Other topics continued…

Evaluation scheme

- Midterm I: 15%
- Midterm II: 15%
- Tutorials/HW   10%
- Lab assignments :   10%

- Final: 50%