Department of Computer Engineering, SVNIT, Surat

M Tech I - 1st Semester, Syllabus and Course Plan, COs

CourseCode: Design and Analysis of Algorithms 3-0-2

Last Edited: 7th Sep 2022

Course Plan

Date	Lect no	Topic(s) to be covered	Hrs
16/8/22	1-2	Introduction, Syllabus, Evaluation scheme, Discussing the problem oriented and assignment centric approach that would be followed. Pseudocode notations to be used. Algorithm analysis Techniques to be employed - illustrating mathematical analysis.	2
17/9/21	3	Illustrating mathematical analysis using the Insertion sort. Justification for using the asymptotic analysis.	1
23/8/22	4-5	Missed: To be adjusted due to inauguration of Forensics Lab. One class adjusted on 21/09/22 and the other on ***	2
24/8/22	6	Approach for empirical analysis, the program to use in the lab. The algorithm BINEXPONENT analysis. Reading Assignment: Asymptotic notations.	1
30/8/22	7-8	Illustrating the failure of Heuristics based approach to solve a problem, using the Robot Arm problem. The need for formal correctness proof. Solving illustrative problems on expressions involving Asymptotic Notations. Lower bound on sorting and the Counting sort.	2
31/8/22	9	Divide and Conquer design technique. Illustrating Merge-sort and its analysis.	1
03/09/22	10-11	Merge-sort Solving recurrences with five different variations viz. substitution, telescopic substitution, Mathematical induction, Recurrence with Ceiling and Floor, Recursion tree method Limitations. Other illustrations of solving recurrences, Applications: Counting Inversions, Introduction to Closest Pairs of Points	2
06/09/22	12-13	Closest Pairs of Points Algorithms and Analysis, Greedy Design technique: The Thirsty-baby problem, Formalizing problem definition, Characteristics of Greedy approach illustrated through the Thirsty-baby problem, The Container Loading problem & its algorithm using Indirect sorting, The Knapsack problem as a specialization of the Container Loading problem: Formal definitions, difference between its variants, The Activity Selection problem and its algorithm	2
07/09/22	14	Proof of the Activity Selection problem, Machine scheduling variant I - proof using contradiction as well as that using the mathematical induction	1
10/09/22	15	Quiz#1	1
13/09/22	16-17	Machine Scheduling: Variant II, its proof. Machine Scheduling Variant III, IV (the NP-Hard one). The variant IV i.e. Classroom scheduling and its proofs.	2
14/09/22	18	EDF Scheduling. EDF scheduling proof. The Optimal Tape Storage problem.	1
20/09/22	19-20	The Quicksort algorithm, illustrating two methods of PARTITION and analysis of the number of comparisons made	2
21/09/22	21	Quicksort analysis: best case, worst case, unbalanced partitioning and balanced partitioning.	1

| 21/09/22 | - | Extra Class: Quicksort average case analysis - One missed class of 23/8/22 adjusted | 1 |