SUBJECT NO-CS31005, SUBJECT NAME- ALGORITHMS -II

LTP- 3-1-0,CRD- 4

SYLLABUS :-

Models of computation: RAM model and its logarithmic cost.Formal introduction to algorithmic paradigms: divide and conquer, recursion, dynamic programming, greedy, branch and bound, etc.Advanced data structures: Fibonacci heap, union-find, splay trees.Amortized complexity analysisRandomized algorithms: Randomized algorithms to be introduced a bit early, i.e. before NP completeness to highlight randomization as an algorithmic technique. Application areas(i)Geometric algorithms: convex hulls, nearest neighbor, Voronoi diagram, etc.(ii)Algebraic and number-theoretic algorithms: FFT, primality testing, etc.(iii)Graph algorithms: network flows, matching, etc.(iv)Optimization techniques: linear programming Reducibility between problems and NP-completeness: discussion of different NP-complete problems like satisfiability, clique, vertex cover, independent set, Hamiltonian cycle, TSP, knapsack, set cover, bin packing, etc. Backtracking, branch and boundApproximation algorithms: Constant ratio approximation algorithms.Miscellaneous: Introduction to external memory algorithms, parallel algorithms.References1.Rajeev Motwani and Prabhakar Raghavan, Randomized Algorithms, Cambridge University Press.2.Allan Borodin, Ran El-Yaniv, Online Computation and Competitive Analysis, Cambridge University Press.3.Nancy Lynch, Distributed Algorithms, Morgan Kaufmann.4.Robert Endre Tarjan, Data Structures and Network Algorithms, SIAM.5.L. Grotchel, L. Lovasz, and A. Schrijver, Geometric algorithms and Combinatorial Optimization, Springer.6.M. Kearns and U. Vazirani, An Introduction to Computational Learning Theory. MIT Press.7.N. Alon and J. H. Spencer, The Probabilistic Method, John Wiley.8.Vijay Vazirani, Approximation Algorithms, Springer.9.Fan Chung, Spectral Graph Theory, American Mathematical Society.