INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING, KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Randomized and Approximation Algorithms	Course No *(will be assigned)*				
Specialization	Mathematics	Structure (LTPC)	3	0	0	3
Offered for	UG/PG/Ph.D	Status	Core ☐		Elective ■	
Faculty	Dr S Vijayakumar	Type	New ■		Modification ☐	
Pre-requisite	COT	To take effect from	Jan 2012			
Submission date	November 2011	Date of approval by AAC				
Objectives	The course aims to provide a panoramic view of the spirit of algorithms design of the time with illustrations. In particular, the course contents try to fathom the power of randomization, linear programming, and Markov chains.					
Contents of the course *(With approximate break up of hours)*	Greedy, Divide and Conquer and Dynamic Programming: Scheduling, MST, Set cover, Network Flow, Network Flow Applications, Matchings. (8 Hrs) Randomized Algorithms: Probability, QuickSort, Karger's Min-Cut Algorithm. Randomized Load Balancing and Hashing. Bloom filters. (8 Hrs) NP-completeness. Approximation Algorithms. Approximation via Local Search or Combinatorial Analysis. (8 Hrs) Linear Programming, LP Rounding. Randomized Rounding, Concentration Bounds. LP Duality, Primal-dual algorithms. (10 Hrs) Markov Chains and Approximate Counting. (8 Hrs)					
Textbook	1. John Kleinberg and Eva Tardos. Algorithm Design, Addison Wesley, 2005.					
References	2. Vijay Vazirani. Approximation Algorithms, Springer-Verlag, Berlin, 2001. 3. Randomized algorithms. Rajeev Motwani and Prabhakar Raghavan Cambridge University Press, 1995. 4. Thomas Cormen, Charles Leiserson, Ronald Rivest, and Clifford Stein. Introduction to Algorithms, MIT Press, 2009.					