

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Advanced Data Structures and Algorithms
2.	Course Number	CS5101
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Computer Science & Engineering
8.	To take effect from	July 2018
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: To teach designing, analysing, and implementing various algorithms and data structures for different kinds of computational problems. To expose advanced algorithmic paradigms and analysis to handle intractable problems.	
12.	Course Content: Review of classical data structures, algorithmic paradigms: Asymptotic analysis of recurrences, algorithm analysis and design techniques: Divide and conquer, dynamic programming, greedy algorithms, graph algorithms, and analysis of hashing algorithms. Advanced algorithmic paradigms and analysis: Backtracking, branch and bound amortized analysis, priority queues and their extensions: Binomial heaps, Fibonacci heaps, splay trees. Network flows-max flow, min-cut theorem, Ford-Fulkerson, Edmonds-Karp algorithm, bipartite matching, NP-completeness and reductions, randomised algorithms, exact exponential-time algorithms, data-driven algorithms.	
13.	Text book(s): 1. Coreman, Leiserson, Rivest, and Stein, <i>Introduction to Algorithms</i> , MIT Press, Third Edition, (2009).	
14.	Reference(s): 1. Dasgupta, Papadimitrou, and Vazirani, <i>Algorithms</i> , McGraw-Hill Education, (2006). 2. Kleinberg , and Tardos, <i>Algorithm Design</i> , Pearson, (2005). 3. Fedor Fomin, and Dieter Kratsch, <i>Exact Exponential Algorithms</i> , Springer, (2010).	