

**INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI**  
**PROFORMA FOR MODIFIED COURSE**

1.	Title of the Course	Communication Networks
2.	Course Number	EE5022
3.	Status of the Course	Elective
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	Modification to EE5022 (Wireless Networks)
7.	To be Offered by	Dr. K. P. Naveen
8.	To take effect from	July 2018
9.	Prerequisite	CoT
10.	Whether approved by the Department	Yes
11.	<b>Course Objective:</b> To introduce the fundamentals of modern communication networks (e.g., cellular and WiFi) and next-generation ad-hoc wireless networks. To understand essential mathematical techniques for modeling and performance analysis of these networks. To develop algorithms for channel access, congestion control, and resource allocation in communication networks.	
12.	<b>Course Content:</b> Engineering concepts: basics of communication systems, CDMA and OFDMA, WiMAX (IEEE 802.16), random access and wireless LAN, Aloha and slotted Aloha, carrier sensing and collision avoidance, IEEE 802.11 WLAN (WiFi), mesh networks, link activation constraints, link scheduling and stability, max-weight scheduling, fairness, connectivity and capacity. Mathematical concepts: random processes (law of large numbers, central limit theorem, Chernoff bound, Poisson processes), queueing theory (Markov chains, M/M/1 queues, Little's theorem), convex optimization (convex functions, Lagrangian, KKT conditions), and game theory (utilities, pure and mixed strategies, Nash equilibrium).	
13.	Text book(s): 1. R. Srikant, L. Ying, <i>Communication Networks: An Optimization, Control and Stochastic Networks Perspective</i> , Cambridge University Press, (2014). 2. A. Kumar, D. Manjunath and J. Kuri, <i>Wireless Networking</i> , Elsevier, (2008).	
14.	Reference(s): 1. D. P. Bertsekas, R. G. Gallager, <i>Data Networks</i> , Prentice Hall, (1992).	