1.	Title of the course	Communication Networks
2.	Course number	EE509L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To EE5022/5
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** 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	
10.	**Course Content:** 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).	
11.	**Textbook(s):** 1. Srikant R, and Ying L,Communication Networks: An Optimization, Control and Stochastic Networks Perspective, Cambridge University Press (2014). 2. Kumar A, Manjunath D and Kur J, *Wireless Networking,* Elsevier (2008).	
12.	**Reference(s):** 1. Bertsekas D P, and Gallager R G, *Data Networks,* Prentice Hall (1992).	