Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NECD551	Wireless Communication Systems	3	0	0	3

Course Objective
This course will provide the fundamental mechanism behind the wireless communication techniques (3G, 4G, 5G).
Learning Outcomes
At the end of the course, the student must be able to acquire knowledge on various wireless communication technologies which is very much helpful for academia research and Industries working in wireless communication technologies.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction and evolution of wireless and mobile radio communication system. Salient features of 2G, 3G and 4G Cellular networks, Cellular concept system design fundamentals, Frequency reuse, Handoff, Interference and system capacity, Trunking and Grade of Service, Improving coverage and capacity in cellular systems	9	Acquire an understanding of the basic cellular concept with capacity and handoff theory.
2	Mobile Radio Propagation- Large-Scale Path Loss: Introduction, Free Space Propagation Model, Log-distance Path Loss Model, Log-Normal Shadowing, Coverage area, Outdoor Propagation Models, Indoor Propagation Models	8	Develop an understanding about the large-scale propagation path-loss model.
3	Small Scale Fading and Multipath: Impulse Response Model of a Multipath Channel, Parameters of Mobile Multipath Channels, Types of Small-Scale Fading (Flat, Frequency-Selective, Fast, Slow Fading), Rayleigh and Ricean Fading	8	Understand the concept of small-scale fading of wireless communications.
4	Digital Modulation: Pulse Shaping Techniques, BPSK, DPSK, QPSK, Offset QPSK, $\pi/4$ QPSK, BFSK, MSK, GMSK, M-ary PSK, M-ary QAM. Derivation of Probability error.	10	Understand the concept of BER for wireless channel using various digital modulation techniques.
5	Introduction to MIMO OFDM Technique, with the concept of diversity and detection techniques.	7	Develop an under stationg about the MIMO based 4G technology.
	Total	**42**	

Text Books:

1. Rappaport, Theodore S. "Wireless communications: Principles and practice." (2002).
2. Goldsmith, Andrea. Wireless communications. Cambridge university press, 2005

Reference Book:

1. Tse, David, and PramodViswanath. Fundamentals of wireless communication. Cambridge university press, 2005.