

GANPAT UNIVERSITY									
FACULTYOFDIPLOMA ENGINEERING									
Programme		Diploma Engineering				Branch/Spec.	Electronics and Communication Engineering		
Semester		V				Version	1.0.0.0		
Effective from Academic Year			2026-27			Effective for the Batch admitted in		July 2024	
Course Code		1EC5101	Course Name			Wireless Communication			
Teaching Scheme						Examination Scheme(Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	2	0	5	Theory	40	60	100
Hours	3	0	4	0	7	Practical	60	40	100
Pre-requisites									
Analog and Digital Communication									
Course Outcomes									
On successful completion of the course, the students will be able to:									
CO1	Understand cellular concepts and signal propagation in mobile communication.								
CO2	Differentiate between Large scale and Small scale propagation.								
CO3	Comprehend various multiple access schemes.								
CO4	Compare diversity schemes and equalization.								
Theory Syllabus									
Unit	Content								Hrs.
1	Cellular Concept And Wireless System (System Design Fundamentals): Hexagonal cell and frequency reuse, hard, soft and forced handoffs, umbrella cell concept, distance to frequency reuse distance, channel and co channel interference reduction factor, S/I ratio consideration and calculation of minimum co-channel and Adjacent interference, Improving coverage and capacity-cell splitting, cell sectorization, repeaters, microcell zone Concept, Wireless Standards: System examples- GSM, EDGE, GPRS, IS-95, CDMA 2000 and WCDMA, 2G 3G, 4G and 5G cellular mobile standards.								11
2	Signal propagation: Propagation mechanism, reflection, refraction, diffraction and scattering, large scale signal propagation and lognormal shadowing. Fading channels-Multipath and small-scale fading-Doppler shift, statistical multipath channel models, narrowband and wideband fading models, power delay profile, average and rms delay spread, coherence bandwidth and coherence time, flat and frequency selective fading, slow and fast fading, average fade duration and level crossing rate. Capacity of flat and frequency selective channels.								12
3	Multiple access schemes: FDMA, TDMA, CDMA and SDMA. Modulation schemes- BPSK, QPSK and variants, QAM, MSK and GMSK, multicarrier modulation, OFDM, Model of a Spread-spectrum digital communication systems, Direct sequence Spread-spectrum systems, Generation of PN Sequence, Frequency-Hopped spread spectrum, Code Division multiple Access, RAKE receiver.								10
4	Diversity and Equalization: Diversity receivers- selection and MRC receivers, diversity techniques, Equal gain combining (EGC), maximal ratio combining (MRC), selection combining (SC), transmit Beamforming (TB). Transmit diversity Altamonte scheme, MIMO and space time signal processing, spatial multiplexing, diversity/multiplexing tradeoff. Fundamentals of equalization, generic adaptive equalization.								12
Practical Content									
Practical assignments are based on the above syllabus.									
Text Books									
1	Theodore S. Rappaport, “Wireless Communications Principles and Practice”, PHI, II Edition, 2006.								

Reference Books	
1	D. Tse & P. Vishwanath, "Fundamentals of Wireless Communication," Cambridge University.
2	William Lee , "Mobile Cellular Telecommunications: Analog and Digital Systems", McGraw Hill Education.
3	Sassan Ahmadi, 5G NR: Architecture, Technology, Implementation, and Operation of 3GPP New Radio Standards Hardcover – 1 June 2019.
4	Erik Dahlman, Stefan Parkvall, Johan Sko, "4G, LTE-Advanced Pro and The Road to 5G", Elsevier publication, Third Edition, 2016.
ICT/MOOCs Reference	
1	https://nptel.ac.in/courses/106/106/106106167/

Mapping of CO with PO and PSO:															
	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P S O 1	P S O 2	P S O 3
CO1	2	2	1	1	2	0	0	0	0	1	0	2	2	1	1
CO2	3	3	3	2	2	0	0	0	1	1	1	2	1	2	2
CO3	2	2	1	2	1	0	0	0	0	1	0	2	2	1	1
CO4	3	1	2	2	1	0	0	0	0	1	0	3	1	2	2