GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology			Branch/Spec.	Electronics and Communication Engineering
Semester	VII			Version	1.0.0.0
Effective from Academic Year	2026-27			Effective for the Batch admitted in	July 2023
Course Code	2EC7101	Course Name		Wireless Communication and Mobile Computing	

Teaching Scheme						Examination Scheme(Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

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- IS-95, CDMA 2000 and WCDMA, 4G and 5G cellular mobile standards, 5G NR.	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, SDMA, RSMA. 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, linear-ZFE and DFE.	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:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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