



National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	M.Tech/Ph.D	Year of Regulation	2018-2019
Department	Electronics and Communication Engineering	Semester	I

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EC 527	Wireless and Mobile Communication	3	0	0	3	50	50	100	200

Course Code	Course Name	Course Objectives	Course Outcomes	Marks Distribution			
				INT	MID	END	Total
EC 527	Wireless and Mobile Communication	To provide students an understanding of the concepts related to wireless channel modelling.	CO1	Able to gain insights into various mobile radio propagation models and the fading effects on the system performance			
		To explore communication concepts and techniques for exploiting wireless channel characteristics and application of these concepts in a system context.	CO2	Able to model the wireless channel in terms of large scale/small scale fading, delay spread, coherence time parameters			
		To familiarize students on the concepts of mobile communication	CO3	Able to understand the basic concepts of Cellular System, the design requirements and CDMA technology			
		To familiarize students with capacity analysis, multiple access techniques in 3G, 4G and 5G, and how the diversity can be exploited to improve performance	CO4	Able to analyse the effectiveness of diversity techniques to mitigate the multichannel fading effects on received signals with insights on MIMO technology, channel capacity analysis, and UWB performance.			

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
1	CO1	3	2	2	1	0	0	0	0	2	0	0	0	3	2	3	0
2	CO2	2	3	2	2	0	0	0	0	2	0	0	0	3	1	2	0
3	CO3	1	2	3	2	2	0	0	0	0	0	0	1	2	2	3	0
4	CO4	1	3	3	0	0	0	0	0	1	0	0	0	2	3	2	0

SYLLABUS

No.	Content	Hours	COs
I	Wireless communications and diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Diversity modeling for Wireless Communications, BER Performance Improvement with diversity, Types of Diversity – Frequency, Time, Space	09	CO1
II	Broadband wireless channel modelling: WSSUS Channel Modeling, RMS Delay Spread, Doppler Fading, Jakes Model, Autocorrelation, Jakes Spectrum, Impact of Doppler Fading	04	CO2
III	Cellular communications: Introduction to Cellular Communications, Frequency reuse, Multiple Access Technologies, Cellular Processes - Call Setup, Handover etc.	07	CO3
IV	CDMA: Introduction to CDMA, Walsh codes, Variable tree OVSF, PN Sequences, Multipath diversity, RAKE Receiver, CDMA Receiver Synchronization	06	CO3
V	MIMO: Introduction to MIMO, MIMO Channel Capacity, MIMO Spatial Multiplexing, MIMO Diversity, MIMO, OFDM	07	CO4
VI	UWB (Ultrawide Band): UWB Definition and Features, UWB Wireless Channels, UWB Data Modulation, Uniform Pulse Train, Bit- Error Rate Performance of UWB	03	CO4
Total Hours		36	

Essential Readings

1. D. Tse and P. Vishwanath, "Fundamentals of Wireless Communications", 2nd edition, Cambridge Univ Press, 2005.
2. A. Goldsmith, "Wireless Communications", 2nd edition, Cambridge Univ Press, 2005.
3. Jochen Schiller, "Mobile Communication", 2nd edition, Pearson Education, 2003.
4. T.S. Rappaport, "Wireless Communications – Principles and Practice", 2nd edition, Pearson, 2010.
5. Ezio Biglieri, "MIMO Wireless Communications", 1st edition, Cambridge University Press, 2007.