

Subject with Code : Wireless Communication

Course & Branch: B.Tech – ECE

&Networks (16EC441)

Year &Sem: IV-B.Tech& II-Sem

Regulation: R16

UNIT –I INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS

1		Write about Evolution of a Mobile Radio Communication Systems in	[L1] [CO1]	[12M]
		detail.		
2		Discuss the following examples of Wireless Communication Systems	G 41 (GO 41	F 43 F3
		a) Paging Systems		[4M]
		b) Cordless telephone Systems		[4M]
		c) Cellular Telephone Systems.		[4]/1]
3		Discuss the following briefly.		
		a)CSMA Protocols	[L2] [C01]	[6M]
		b) FDMA	[L2] [CO1]	[6M]
4		Give the details about the following types of mobile communications in		
		detail.	[L2] [CO1]	[4M]
		a) SDMA	[L2][CO1]	[4M]
		b) TDMA	[L2] [CO1]	[4M]
F		c) CDMA		
3		what is 3G mobile communications? Give the details about the following		
		types of 5G modiles.		[4]]
		b) TD_SCDMA	[L2][C01]	[41V1] [41V1]
		c) CDMA 2000 1x EV	[L2] [C01]	[4]VI] [4]M]
6	a)	What is frequency reuse concept? Take the following 'N' values and	[L2][C01]	[4][1] [6M]
°	,	discuss about the concept. a) $N = 4$ b) $N = 7$	[][]	[0112]
	b)	If a signal to interference ratio of 15 dB is required for satisfactory forward	[L5][CO1]	[6M]
		channel performance of a cellular system, what is the frequency reuse		
		factor and cluster size that should be use for maximum capacity if the path		
		loss exponent is a) $n = 4$ b) $n = 3$? Assume that there are 6 co-channels cells		
		in the first tier and all of them are at the same distance from the mobile, use		
		suitable approximations.		
7		Discuss different techniques used for improving coverage and capacity in	[L2] [CO1]	[12M]
0		cellular systems	[] 3 [[001]	[10] []
8 0		Compare Retuyeen EDMA, TDMA, CDMA, and SDMA		[12NI]
9		A certain city has an area of 1300 square miles is covered by a cellular		
10		system using a 7 cell rayse pattern. Each Cell has a radius of 4 miles and		
		the situ is allocated 40 MHz of spectrum with a full duplay shannel		
		has been been been been been been been bee		
		bandwidth of 60 KHz. Assume GOS of 2% for and Erlang B system is		
		specified. If the offered traffic per user is 0.03 Erlangs. Find		
		a) The number of cells in the service area	[L5][CO1]	[2M]
		b) The number of channels per cell	[L5][CO1]	[2M]
		c) Traffic intensity of each cell	[L5][CO1]	[2M]

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	d) The maximum carried traffic.	[L5][CO1]	[3M]	
	e) The total number of users that can be served for 2% GOS	[L5][CO1]	[3M]	

UNIT –II **MOBILE RADIO PROPAGATION**

1	a)	Explain the Free space propagation model?	[L2] [CO2]	[6M]	
	b)	Explain three different propagation mechanisms.	[L2] [CO2]	[6M]	
2	a)	What is Reflection? Explain in detail the reflection from dielectric and	[L2] [CO2]	[6M]	
		conductors.			
	b)	Define Diffraction and Scattering.	[L1] [CO2]	[6M]	
3	a)	Explain in detail the indoor & outdoor propagation model.	[L2] [CO2]	[6M]	
	b)	Write short notes on small scale fading.	[L2] [CO2]	[6M]	
4	a)	Explain in detail the small-scale multipath propagation and its different	[L2] [CO2]	[6M]	
		Measurements			
	b)	Discuss Rayleigh & Rician distributions.	[L2] [CO2]	[6M]	
5	a)	Explain the terms			
		i) Fresnel Zone geometry	[L1] [CO2]	[3 M]	
		ii) Knife edge diffraction model	[L1] [CO2]	[3M]	
	b)	Explain Radar cross section model.	[L1] [CO2]	[6M]	
6	a)	Give the basic classification of Small Scale fading	[L4] [CO2]	[6M]	
	b)	Explain the types of small scale fading based on multipath time delay	[L2] [CO2]	[6M]	
		spread.			
7	a)	Explain fading effects due to Doppler spread.	[CO2] [L1]	[6M]	
	b)	Discuss Flat fading and Frequency selective fading.	[L4] [CO2]	[6M]	
8	a)	Describe the statistical models of radio propagation.	[L1] [CO2]	[6M]	
	b)	Design the simulation methods of these models.	[L6] [CO2]	[6M]	
9	If a	If a transmitter produces 50W of power, express the transmit power in units of [L5] [CO2]			
	(A)	A) dBm and dBW. If 50W is applied to a unity gain antenna with a 900MHz			
	car	rier frequency, find the received power in dBm at a free space distance of			
	100	00m from the antenna. Determine Pr (10Km)? Assume unity gain for the			
	rec	eiver antenna.			
10	a)	Find the far-field distance for an antenna with maximum dimension of 1m	[L1] [CO2]	[3M]	
		and operating frequency of 900MHz.			
	b)	Define radar cross section?	[L1] [CO2]	[2M]	
	c)	Define fast fading and slow fading channels?	[L1] [CO2]	[2M]	
	d)	List the factors influencing small scale fading?	[L1] [CO2]	[3M]	
	e)	Define intrinsic impedance& Brewster angle?	[L1] [CO2]	[2M]	

UNIT –III EQUALIZATION AND DIVERSITY TECHNIQUES

1		Explain in detail about Linear Equalizers of the following with neat		
		diagram.	[L2] [CO3]	[6M]
	a)	Linear Transversal Equalizer.	[L2] [CO3]	[6M]
	b)	Lattice Equalizer.		
2		What is Non – Linear Equalizer? Explain in detail of the following.		
	a)	Decision Feedback Equalization (DFE).	[L2] [CO3]	[6M]
	b)	Maximum Likelihood Symbol Detection.	[L2] [CO3]	[6M]
3		Draw and explain Maximum Likelihood Sequence Estimation (MLSE)	[1 3] [CO3]	[1 2]
		in detail.	[L3][C03]	
4		Discuss Survey of Equalization Techniques in detail.	[L1] [CO3]	[12M]
5		Explain of the Following in detail.		
	a)	Least Mean Square Algorithm (LMS).	[L2] [CO3]	[6M]
	b)	Recursive Least Squares Algorithm (RLS).	[L2] [CO3]	[6M]
6		What is RAKE Receiver explain it with diagram in detail?	[L1] [CO3]	[12M]
7		Explain following diversity techniques in detail.		
	a)	Maximal ratio Combiner	[L2] [CO3]	[6M]
	b)	Scanning Diversity	[L2] [CO3]	[6M]
8		Derive the expression for Maximal Ratio Combining Improvement.	[L4] [CO3]	[12M]
9		Consider the design of the U.S Digital Cellular Equalizer. If the carrier		
		frequency is 900 MHz and the maximum Doppler shift is 66.67 Hz.		
	a)	Calculate the maximum mobile velocity for the given Doppler Shift.		
	b)	Calculate the coherence time of the channel.		
	c)	Find the Doppler Spread.		
	d)	Assume that the symbol rate is 24.3 k symbols/sec; calculate the	[L5] [CO3]	[12M]
		maximum number of symbols that can be transmitted without		
		updating the equalizer.		
	e)	Assume that there are 5 delay elements in an equalizer and there are 10		
	0	μ s delay in each; calculate the maximum number of taps.		
	(†)	Calculate the maximum multipath delay spread that could be equalized.	FT 13 F C 0 0-	
10	a)	What are the factors used in adaptive algorithms?	[L1] [CO3]	[2M]
	b)	Write the advantages of LMS algorithm.	[L1] [CO3]	[2M]
	c)	What are the advantages of RLS algorithm?	[L1] [CO3]	[2M]
	d)	What is the need of equalization?	[L1] [CO3]	[3M]
	e)	What is tracking mode in an adaptive equalizer	LI CO3	[3 M]

1	a)	Develop the concept of multicarrier modulation techniques in OFDM with suitable diagrams.	[L3][CO4]	[6M]
	b)	Given an OFDM system with bandwidth 10MHz and number of subcarriers 1024. The cyclic prefix comprises of 1/8 of number of samples from the tail of OFDM symbol prefixed in the front. Calculate the total time of the resulting OFDM with cyclic prefix.	[L3][CO4]	[6M]
2	a)	What is a DFT and give its properties?	[L1] [CO4]	[6M]
	b)	Explain the concept of capacity of cellular systems.	[L2] [CO4]	[6M]
3		Discuss PAP reduction schemes with a neat diagram and explain its application	[L4][CO4]	[12M]
4	a)	Explain about the parameters required for OFDM system design.	[L2] [CO4]	[6M]
	b)	Draw the block diagram of OFDM transmitter and receiver. Explain them in detail.	[L2] [CO4]	[6M]
5		Explain in detail of any two methods to reduce peak-to-average power ratio in multicarrier OFDM system.	[L2][CO4]	[12M]
6	a)	Discuss the generation of subcarriers using the IFFT with a neat diagram.	[L4] [CO4]	[6M]
	b)	Explain Vector Coding?	[L1] [CO4]	[6M]
7		Explain the terms:		
	a)	Guard time and Cyclic extension.	[L2] [CO4]	[6M]
	b)	Illustrate the disadvantages of multicarrier OFDM modulation system?	[L2] [CO4]	[6M]
8		Discuss in detail thematrix representation of OFDM with necessary equations.	[L2][CO4]	[12M]
9	a)	Explain the challenges in Multicarrier systems.	[L2] [CO4]	[6M]
	b)	Draw the block diagram of a multicarrier OFDM digital communication.	[L2] [CO4]	[6M]
10	a)	State the need for scrambling in OFDM	[L2] [CO4]	[2M]
	b)	Summarize delay spread?	[L2] [CO4]	[2M]
	(c)	Illustrate the disadvantages of multicarrier OFDM modulation system.	[L2] [CO4]	[2M]
		Explain the need for PPP?	[L2] [CO4]	[3M]
	0)	What are the properties of MIMO channel matrix?	[L1] [CO4]	[3M]

UNIT –IV MULTICARRIER MODULATION

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UNIT –V
WIRELESS NETWORKING

1	a)	Explain the difference between wireless and fixed telephone network	[L2] [CO5]	[6M]
	b)	Explain fixed network Transmission hierarchy in detail?	[L2] [CO5]	[6M]
2	a)	Explain in detail X.25 protocol architecture	[L2] [CO5]	[6M]
	b)	Summarize the common channel signaling.	[L2] [CO5]	[6M]
3		Compare the performance of 1G, 2G, 3G wireless networks.	[L4][CO5]	[12M]
4	a)	Explain the merging wireless networks and PSTN.	[L2] [CO5]	[6M]
	b)	Elaborate packet switching Network	[L6] [CO5]	[6M]
5	a)	Define CCS and also describe its various features?	[L1] [CO5]	[6M]
	b)	List the different types of CSMA protocols?	[L4] [CO5]	[6M]
6	a)	Discuss about public switch telephone network.	[L6] [CO5]	[6M]
	b)	Explain signaling traffic in SS7?	[L2] [CO5]	[6M]
7	a)	Explain the techniques of traffic routing in wireless networks.	[L2] [CO5]	[6M]
	b)	Explain the various generations of wireless networks.	[L2] [CO5]	[6M]
8	a)	Explain Packet switching with neat diagram.	[L2] [CO5]	[6M]
	b)	Explain registration tunneling.	[L2] [CO5]	[6M]
9	a)	Explain the mobile IP operation?	[L5] [CO5]	[6M]
	b)	Compare CDPD and ARDIS in detail?	[L2] [CO5]	[6M]
10	a)	Compare wired and wireless telephone networks?	[L2] [CO5]	[3 M]
	b)	Expand CDPD, ARDIS, RMD.	[L5] [CO5]	[2M]
	c)	Define Packet Radio.	[L1] [CO5]	[2M]
	d)	Define Common channel signaling.	[L1] [CO5]	[2M]
	e)	List the types of Random-Access methods.	[L1] [CO5]	[3 M]

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