SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF ECE
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, TamilNadu

Academic Year: 2024-2025 (ODD)

Test: CLAT- 3

Course Code & Title: 18ECC301T Wireless Communication

Year & Sem: IV & VII

Date: 16.07.2024

Duration: 8.00-9.40 am

Max. Marks: 50

Course Articulation Matrix:

18ECC301T_Wireless Communication						PROGRAM OUTCOMES									PROGRAM STUDENT OUTCOMES		
COURSE OUTCOMES		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	Interpret the concepts of Wireless communication and basic cellular networks	3	-	-	3	-	-	-	-	-	-	-	2	-	-	-
CO 2	Analyze different Radio wave propagation models for cellular communication	-	3	-	3	-	-	-	-	-	-	-	-	-	-	3
CO 3	Apply different multipath propagation channel models in wireless systems	-	3	3	-	-	-	-	-	-	-	-	-	-	-	2
CO 4	Illustrate the Link performance improvement techniques	-	3	-	-	-	-	2	-	-	-	-	-	-	-	3
CO 5	Summarize different wireless communication standards and systems	-	-	2	-	-	2	-	-	-	-	-	-	2	-	-

Part – A (10×1= 10Marks)
Answer all the questions

Q. No		Marks	BL	CO	PO
1.	If the channel is bandlimited to 6 kHz & signal to noise ratio is 16, what would be the capacity of channel? a) 15.15 bps b)30.12 kbps c) 43.24 kbps d)24.52 kbps	1	3	4	2
2.	Consider an AWGN channel with SNR = 17.2 dB. What is the capacity of the channel per unit bandwidth? a) 7.9 bps/Hz b) 6.18 bps/Hz c) 5.74 bps/Hz d) 73.2 bps/Hz	1	3	4	2
3.	Consider the wireless channel with bandwidth of 50 KHz, received power 1 μW and AWGN with PSD $N_0/2$, where $N_0 = 10^{-9} W/Hz$. Find the received SNR. a) -7 dB b) -15 dB c) -17 dB d) -20 dB	1	3	4	2
4.	In maximal ratio combining the output SNR is equals to a) Mean of all individual weighted SNRs b) Maximum of all SNRs c) Sum of individual weighted SNRs d) Minimum of all weighted SNRs	1	2	4	7
5.	Which of these is a necessary condition for optimal power allocation? a) Average transmit power is constant b) Channel state information known at the transmitter c) Channel state information known at the receiver d) Increased transmit power	1	1	4	7
6.	The reverse channel user data stream is first convolutionally encoded with a rate____. a) 1/4 b) 3/4 c) 1/3 d) 1/8	1	1	5	3
7.	A number of independently modulated sub-carriers result in ____. a) Low PAPR b) high PAPR c) Frequency offset d) Timing offset	1	3	5	3
8.	In GSM super frame how many multi frames are available? a) 51 b) 29 c) 53 d) 26	1	1	5	3
9.	A hyper frame in GSM, consists of ------------- super frames a) 256 b)512 c)1024 d)2048	1	1	5	6

No.	Question				
10.	IS-95 channel occupies _____ of spectrum on each one-way link. a) 2.5 KHz b)1.25MHz c)12.5 KHz d)1.25 KHz	1	2	5	6

Part – B1 (2×4= 8Marks)
Answer Any two questions

No.	Question				
11.	Consider a wireless channel where power falloff with distance follows the formula $P_r(d) = P_t(d_0/d)^2$ for $d_0 = 10\ m$. Assume the channel has bandwidth $B = 20\ kHz$ and AWGN with noise power spectral density $N_0/2$, where $N_0 = 10^{-6} W/Hz$. For a transmit power of 1 W, Find the capacity of this channel for a transmit receive distance of 100 m.	4	3	4	2
12.	Describe outage probability and multiplexing gain of a MIMO channel	4	3	4	2
13.	Mention the need of an Equalizer in a communication system.	4	3	4	2

Part – B1 (2×4= 8 Marks)
Answer Any two questions

No.	Question				
14.	Explain GSM operations with speech input to speech output with block diagram	4	2	5	3
15.	State the forward link channels in CDMA IS -95 and specify its uses.	4	2	5	3
16.	List out the importance of Cyclic Prefix in OFDM system	4	3	5	3

Part – C (2×12= 24 Marks)

No.	Question				
17a.	Elaborate the working principle of RAKE receiver in CDMA systems with a neat sketch.	12	3	4	2

(OR)

No.	Question				
17b.	Explain the following combining techniques with neat diagram: i) Selection combining ii) Maximal Ratio Combining	12	2	4	7
18a.	Discuss elaborately the GSM Architecture and interfaces with necessary diagram. Also explain the frame structure of GSM.	12	3	5	3

(OR)

No.	Question				
18b.	With neat diagrams explain the OFDM transmitter and receiver blocks and summarize its working principle.	12	2	5	6

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions

□CO Coverage (%)

□BL Coverage (%)