SARDAR RAJA COLLEGE OF ENGINEERING
ALANGULAM

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MICRO LESSON PLAN

SUBJECT : COMMUNICATION THEORY

CODE : EC 2252

CLASS : II Year / IV SEM

STAFF: Mr. B. BALA MURUGAN, Asst. Prof,

HOD/DEPT. OF ECE

EC 2252 COMMUNICATION THEORY

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UNIT I AMPLITUDE MODULATION SYSTEMS 10

Review of Spectral Characteristics of Periodic and Non-periodic signals; Generation and Demodulation of AM, DSBSC, SSB and VSB Signals; Comparison of Amplitude Modulation Systems; Frequency Translation; FDM; Non – Linear Distortion.

UNIT II ANGLE MODULATION SYSTEMS 8

Phase and Frequency Modulation; Single tone, Narrow Band and Wideband FM Transmission Bandwidth; Generation and Demodulation of FM Signal.

UNIT III NOISE THEORY 8

Review of Probability, Random Variables and Random Process; Guassian Process; Noise – Shot noise, Thermal noise and white noise; Narrow band noise, Noise temperature; Noise Figure.

UNIT IV PERFORMANCE OF CW MODULATION SYSTEMS 10

Superheterodyne Radio receiver and its characteristic; SNR; Noise in DSBSC systems using coherent detection; Noise in AM system using envelope detection and its FM system; FM threshold effect; Pre-emphasis and De-emphasis in FM; Comparison of performances.

UNIT V INFORMATION THEORY 9

Discrete Messages and Information Content, Concept of Amount of Information,Average information, Entropy, Information rate, Source coding to increase average information per bit, Shannon-Fano coding, Huffman coding, Lempel-Ziv (LZ) coding,Shannon's Theorem, Channel Capacity, Bandwidth- S/N trade-off, Mutual information and channel capacity, rate distortion theory, Lossy Source coding.

TUTORIAL 15 **TOTAL: 60 PERIODS**

TEXT BOOKS

1. Dennis Roddy & John Coolen - Electronic Communication (IV Ed.), Prentice Hall of India.
2. Herbert Taub & Donald L Schilling – Principles of Communication Systems (3rd Edition) – Tata McGraw Hill, 2008.

REFERENCES

1. Simon Haykin, Communication Systems, John Wiley & sons, NY, 4th Edition, 2001.
2. Bruce Carlson - Communication Systems. (III Ed.), Mc Graw Hill.
3. B.P.Lathi, Modern Digital and Analog Communication Systems, Third Edition, Oxford Press,2007.
4. R.P Singh and S.D.Sapre, "Communication Systems – Analog and Digital", Tata McGraw Hill, 2nd Edition, 2007.
5. John G. Proakis, Masoud Salehi, Fundamentals of Communication Systems, Pearson Education, 2006.

SUBJECT DESCRIPTION AND OBJECTIVES

AIM

To study the various analog communication fundamentals viz., Amplitude modulation and demodulation, angle modulation and demodulation. Noise performance of various receivers and information theory with source coding theorem are also dealt.

OBJECTIVES

- To provide various Amplitude modulation and demodulation systems.
- To provide various Angle modulation and demodulation systems.
- To provide some depth analysis in noise performance of various receiver.
- To study some basic information theory with some channel coding theorem.

DESCRIPTION

Communication theory is a field of information and mathematics that studies the technical process of information and the human process of human_communication. According to communication theorist Robert T. Craig in his essay 'Communication Theory as a Field' (1999), "*despite the ancient roots and growing profusion of theories about communication*," there is not a field of study that can be identified as 'communication theory'.

Basic elements of communication made the object of study of the communication theory:

- **Source**: Shannon calls it *information source*, which "*produces a message or sequence of messages to be communicated to the receiving terminal*."
- **Sender**: Shannon calls it *transmitter*, which "*operates on the message in some way to produce a signal suitable for transmission over the channel*. In Aristotle it is the *speaker* (orator).
- **Channel**: For Shannon it is "*merely the medium used to transmit the signal from transmitter to receiver*.
- **Receiver**: For Shannon the receiver "*performs the inverse operation of that done by the transmitter, reconstructing the message from the signal*."
- **Destination**: For Shannon destination is "*the person (or thing) for whom the message is intended*".
- **Message**: from Latin *mittere*, "to send". A concept, information, communication or statement that is sent in a verbal, written, recorded or visual form to the recipient.
- **Feedback**
- **Entropic elements, positive and negative**

MICRO LESSON PLAN

Hours	LECTURE TOPICS	READING
UNIT I AMPLITUDE MODULATION SYSTEMS		
1	Review of Spectral Characteristics of Periodic and Non-periodic signals	T1
2		
3	Generation and Demodulation of AM (AV Class)	R1
4		
5	Generation and Demodulation of DSBSC Signals	R4
6	Generation and Demodulation of SSB Signals	T2
7	Generation and Demodulation of VSB Signals	T2
8	Comparison of Amplitude Modulation Systems	T1
9		
10	Frequency Translation	R4 R1
11	FDM	R1
12	Non – Linear Distortion	R1
13		
UNIT II ANGLE MODULATION SYSTEMS		
14	Phase Modulation	R1
15		
16	Frequency Modulation (AV Class)	R4
17	Single tone FM	R1
18		
19	Narrow Band FM	T2
20	Wideband FM	R1
21	Transmission Bandwidth	T2
22		
23	Generation and Demodulation of FM Signal.	R1
24		
UNIT III NOISE THEORY		
25	Review of Probability, Random Variables and Random Process	R1
26		
27	Guassian Process	R1
28	Noise – Shot noise	R1
29	Thermal noise (AV Class)	R4
30	White noise	R4
31	Narrow band noise	R1
32	Noise temperature	R1
33	Noise Figure	T2
34	Problems	
35		

UNIT IV PERFORMANCE OF CW MODULATION SYSTEMS		
36 37	Superheterodyne Radio receiver and its characteristic	R1
38 39	SNR: Noise in DSBSC systems using coherent detection	R1
40 41	Noise in AM system using envelope detection and its FM System (AV Class)	R4
42	FM threshold effect	T2
43 44	Pre-emphasis and De-emphasis in FM	T2
45 46	Comparison of performances	R4
47,48	Problems	
UNIT V INFORMATION THEORY		
49	Discrete Messages	R1
50	Information Content	T2
51	Concept of Amount of Information, Average information, Entropy	R1
52	Information rate	T2
53	Source coding to increase average information per bit,	R1
54	Shannon-Fano coding,	R4
55	Huffman coding,	R1
56	Lempel-Ziv (LZ) coding	R1
57	Shannon's Theorem, Channel Capacity	R1
58	Bandwidth- S/N trade-off	T2
59	Mutual information and channel capacity (AV Class)	R1
60	Rate distortion theory	R1
61	Lossy Source coding.	R1
62,63	Problems	

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