

Course Number and Name												
BEC504 - COMMUNICATION ENGINEERING I												
Credits and Contact Hours												
3 and 45												
Course Coordinator's Name												
Mr R.Mohan Raj												
Text Books and References												
TEXT BOOKS												
1. John G. Proakis & Masoud Salehi, " <i>Communication System Engineering</i> ", 2nd Edition, 2002.												
2. R.P. Singh & S.D. Sapre, " <i>Communication Systems: Analog & Digital</i> ", 3rd Edition, Tata McGraw-Hill, 2012.												
REFERENCES												
1. Sanjay Sharma, " <i>Communication Systems, Analog & Digital</i> ", S.K. Kataria & Sons, 5th Edition, 2009.												
2. Dennis Reddy & John Coolen, " <i>Electronic Communications</i> ", 4 th Edition, Prentice Hall, 2008.												
3. www.techvyom.com												
Course Description												
<ul style="list-style-type: none"> Analog modulation and demodulation techniques. Acquiring mathematical understanding of Analog Communication Systems. Understanding the trade-offs (in terms of bandwidth, power, and complexity requirements) Performance evaluation of communication systems in the presence of noise. 												
Prerequisites						Co-requisites						
Signals and Systems						Nil						
required, elective, or selected elective (as per Table 5-1)												
required												
Course Outcomes (COs)												
CO1 Students will have knowledge of basic mathematical concepts and from a block-diagram system approach.												
CO2 It will allow thinking in the two "domains" of communications, the time domain and the frequency domain.												
CO3 To evaluate communication systems in the presence of noise.												
CO4 They will have knowledge of basic types of analog modulation (AM, FM, and PM) from mathematical description.												
CO5 To understand trade-offs (in terms of bandwidth, power, and complexity requirements)												
CO6 Design of practical communication system at the block diagram level under certain constraints and requirements												
Student Outcomes (SOs) from Criterion 3 covered by this Course												
COs/SOs	a	b	c	d	e	f	g	h	i	j	k	
CO1	H		M	H		M	M			M		
CO2	M	M					M		M			
CO3	M	M		H	M	L			M	L		
CO4	M		M		H					M		
CO5		M		M		M			H			
CO6	H	M		M	M		M		M			

List of Topics Covered

UNIT I - AMPLITUDE MODULATION SYSTEMS

10

Need for modulation, Amplitude Modulation System, Single Tone & Multiple Tone Amplitude Modulation, Power Relation, Generation of Amplitude Modulation – Linear Modulation – Collector Modulation method Non-linear Modulation – Square law Modulator, Product Modulator, Switching Modulator - Demodulation of Amplitude Modulation – Envelope Detector, Coherent Detector, VSB, Performance comparison of various Amplitude Modulation System.

UNIT II - ANGLE MODULATION SYSTEMS

10

Frequency Modulation, Types of Frequency Modulation, Generation of NBFM, WBFM, Transmission BW of FM Signal, Phase Modulation. Relationship between PM & FM, Comparison, Generation of FM Direct Method, Indirect method, Demodulation of FM - FM Discriminators.

UNIT III - RADIO RECEIVERS

6

Introduction – Functions & Classification of Radio Receivers, Tuned Radio Frequency (TRF) Receiver, Superheterodyne Receiver – Basic Elements, Receiver Characteristics, Frequency Mixers, AGC Characteristics

UNIT IV - NOISE THEORY

9

Noise, Types of noise, White Noise, Addition of Noise due to several sources in series and parallel, Generalized Nyquist Theorem for Thermal Noise, Calculation of Thermal Noise for a Single Noise Source, RC Circuits & Multiple Noise sources. Equivalent Noise Bandwidth, Signal to Noise Ratio, Noise-Figure, Noise Temperature, Calculation of Noise Figure, Noise Figure Determination for Cascaded Stages of Amplifiers

UNIT V - PERFORMANCE OF COMMUNICATION SYSTEM

10

Receiver Model, Noise in DSB-SC Receivers, Noise in SSB-SC Receivers, Noise in AM receiver (Using Envelope Detection), Noise in FM Receivers, FM Threshold Effect, Threshold Improvement through Pre-Emphasis and De-Emphasis, Noise in PM system – Comparison of Noise performance in PM and FM, Link budget analysis for radio channels.