

<b>Course Title</b>	<b>Analog Communication Engineering</b>	
<b>Course Code</b>	<b>EC408</b>	
<b>Course Credit</b>	Theory	: 03
	Practical	: 01
	Tutorial	: 00
	Credits	: 04
<b>Course Learning Outcomes</b>		
<p>After the completion of the course students will be able to</p> <ul style="list-style-type: none"> <li>• <b>Describe</b> different types of noise and <b>predict</b> its effect on various analog communication systems.</li> <li>• <b>Analyze</b> energy and power spectral <b>density</b> of the signal.</li> <li>• <b>Express</b> the basic concepts of analog modulation schemes</li> <li>• <b>Evaluate</b> analog modulated waveform in time /frequency domain and also find modulation index.</li> <li>• <b>Develop</b> understanding about performance of analog communication systems</li> <li>• <b>Calculate</b> bandwidth and power requirements for analog systems.</li> <li>• <b>Analyze</b> different characteristics of receiver.</li> </ul>		
<b>Detailed Syllabus</b>		
<b>Sr. No.</b>	<b>Name of chapter &amp; details</b>	<b>Hours Allotted</b>
<b>Section – I</b>		
<b>1</b>	<b>Communication Introduction</b> Types of signals, types of Channels and its effect on signals, types of analog communication systems.	<b>02</b>
<b>2</b>	<b>Noise :</b> Noise (Thermal noise, Shot noise, Partition noise, Low frequency or flicker noise, Burst noise, Avalanche noise, Bipolar transistor noise, Field-effect	<b>08</b>

	transistor noise, Equivalent input noise generators and comparison of BJTs and FETs, Signal – to – noise ratio, S/N Ratio of a tandem connection, Noise factor, Amplifier input noise in terms of F, Noise factor of amplifiers in cascade, Noise factor of a lossy network, Noise temperature, Measurement of noise temperature and noise factor, Narrowband band-pass noise.	
<b>3</b>	<b>Analysis and Transmission of Signals:</b>  A periodic signal representation by Fourier integral, Transform of some useful function, Some properties of the Fourier transform, Signal transmission through a linear system, Ideal and practical filters, Signal distortion over a communication channel, Signal energy and energy spectral density, Signal power and power spectral density	<b>11</b>
<b>Section – II</b>		
<b>4</b>	<b>Amplitude Modulation and Demodulation:</b>  Need of modulation, Baseband versus carrier communications, amplitude modulation, modulation index, Double-Sideband amplitude modulation, modulator and demodulators circuits, AM transmitter and receiver circuit, Bandwidth-efficient amplitude modulation (SSB), SSB modulators, SSB generation methods, SSB reception methods.	<b>09</b>
<b>5</b>	<b>Angle Modulation and Demodulation:</b>  Nonlinear modulation, Bandwidth of Angle-Modulated waves, Generating FM waves, Demodulation of FM signals, Effect of nonlinear distortion and interference, FM Broadcasting System.	<b>06</b>
<b>6</b>	<b>Receivers :</b>  Super heterodyne receivers, Tuning range, Tracking, Sensitivity and gain, Image rejection, Spurious responses, Adjacent channel selectivity, AGC, Double conversion, Electronically Tuned Receivers (ETRs), Integrated- Circuit Receivers.	<b>06</b>

### Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, blackboard, OHP etc. Assignments based on course contents will be given to the students at the end of each unit/topic and will be evaluated at regular interval
- Minimum ten experiments shall be there in the laboratory related to course contents

### Reference Books

1. Kennedy” Electronic Communications” McGraw Hill Publication, ISBN-13:978-0-07-463682-4; ISBN-10:0-07-463682-0.
2. Dennis Roddy, John Coolen,”Electronics Communications“,Pearson Prentice Hall, 4<sup>th</sup> Edition ISBN: 978-81-7758-558-2
3. B.P.Lathi, “Digital and analog communication system“, international 4<sup>th</sup> Edition, OXFORD university press, ISBN : 0195110099, 9780195110098
4. Frenzel Louis E.”Communication Electronics: principles & Application” Tata McGraw Hill Publication, 3<sup>rd</sup> edition, ISBN-0-02-804837-7
5. Roy Blake, ”Electronics communication systems”,Cengage Learning private limited,1<sup>st</sup> edition,2012,ISBN:13:978-81-315-1841-0

### Additional Resources

- <http://iitg.vlab.co.in/?sub=59&brch=163&sim=259&cnt=359>
- <http://nptel.ac.in/courses/117102059/1>
- <http://nptel.ac.in/courses/117102059/8>

LIST OF EXPERIMENTS

Sr No.	Name of Experiment
1	To <b>perform</b> Amplitude Modulation and <b>sketch</b> the appropriate waveform.
2	To <b>examine</b> modulation index of AM using trapezoidal method.
3	To <b>perform</b> DSBSC modulation and <b>sketch</b> the appropriate waveform.
4	To <b>perform</b> SSBSC modulation and <b>sketch</b> the appropriate waveform.
5	To <b>construct</b> modulating signal from AM waves using diode detector.
6	To <b>plot</b> fidelity curve for radio receiver
7	To <b>perform</b> frequency modulated waveform & to measure peak frequency deviation.
8	To <b>perform</b> FM demodulation using PLL
9	To <b>perform</b> Super heterodyne Receiver
10	To <b>analyze</b> various signal parameters using Spectrum Analyzer
11	To <b>evaluate</b> the Noise Figure of Audio Amplifier.
12	To <b>plot</b> and <b>compare</b> various modulations using simulation.