

# KADI SARVA VISHWAVIDYALAYA

**B. E. Semester: V**  
**Electronics & Communication Engineering**  
**Subject Name: Electronic Communication**  
**Subject Code: EC-504**

W.E.F2014-15

## **A. Course Objective:**

The educational objectives of this course are

- To present a problem oriented introductory knowledge of Electronic Communication.
- To address the underlying concepts and methods behind Electronic Communication

## **B. Teaching / Examination Scheme**

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs	Hrs	Marks	Marks	Marks	Marks	Marks	
EC-504	<b>Electronic Communication</b>	4	0	2	6	5	3	70	30	20	30	150

## **C. Detailed Syllabus:**

### **Communication Introduction**

1 Communication system, Analog and digital Messages, Channel effect, Modulation and detection, Historical review of telecommunication.

### **Passive Circuits :**

2 Series tuned circuit, Parallel tuned circuit, Self-capacitance of a coil, Skin effect, Mutual inductance, High frequency transformers, Tapped inductor, Capacitive tap, Low-frequency transformers

### **Analysis and Transmission of Signals:**

3 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.

### **Noise :**

4 Noise (Thermal noise, Shot noise, Partition noise, Low frequency or flicker noise, Burst noise, Avalanche noise, Bipolar transistor noise, Field-effect 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.

### **Receivers :**

5 Superhetrodyne receivers, Tuning range, Tracking, Sensitivity and gain, Image rejection, Spurious responses, Adjacent channel selectivity, AGC, Double conversion, Electronically Tuned Receivers(ETRs), Integrated-Circuit Receivers

6 **Amplitude Modulation and Demodulation:** Baseband versus carrier communications, Double-Sideband amplitude modulation, Amplitude Modulation, Bandwidth-efficient amplitude modulation, Amplitude modulations: Vestigial sideband, Local carrier synchronization, Frequency division multiplexing, Phase-locked loop with applications, Frequency synthesizers.

## KADI SARVA VISHWAVIDYALAYA

### Angle Modulation and Demodulation:

Nonlinear modulation, Bandwidth of Angle-Modulated waves, Generating FM waves, Demodulation of FM signals, Effect of non linear distortion and interference, Superhetrodyne analog AM/FM receivers, FM Broadcasting System.

#### D. Lesson Planning:

SR. No.	No. of Hours	% Weight-age in Exam	Topic
1	06	05	<b>Communication Introduction</b> Communication system, Analog and digital Messages, Channel effect, Modulation and detection, Historical review of telecommunication.
2	08	10	<b>Passive Circuits :</b> Series tuned circuit, Parallel tuned circuit, Self-capacitance of a coil, Skin effect, Mutual inductance, High frequency transformers, Tapped inductor, Capacitive tap, Low-frequency transformers
3	08	15	<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.
4	08	15	<b>Noise :</b> Noise (Thermal noise, Shot noise, Partition noise, Low frequency or flicker noise, Burst noise, Avalanche noise, Bipolar transistor noise, Field-effect 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.
5	10	15	<b>Receivers :</b> Superhetrodyne receivers, Tuning range, Tracking, Sensitivity and gain, Image rejection, Spurious responses, Adjacent channel selectivity, AGC, Double conversion, Electronically Tuned Receivers(ETRs), Integrated-Circuit Receivers
6	10	20	<b>Amplitude Modulation and Demodulation:</b> Baseband versus carrier communications, Double-Sideband amplitude modulation, Amplitude modulation, Bandwidth-efficient amplitude modulation, Amplitude modulations: Vestigial sideband, Local carrier synchronisation, Frequency division multiplexing, Phase-locked loop with applications, Frequency synthesizers.
7	10	20	<b>Angle Modulation and Demodulation:</b> Nonlinear modulation, Bandwidth of Angle-Modulated waves, Generating FM waves, Demodulation of FM signals, Effect of non linear distortion and interference, Superheterodyne analog AM/FM receivers, FM Broadcasting System
<b>Total</b>	<b>60</b>	<b>100</b>	

#### E. Instructional Method And Pedagogy (ANNEXURE-I)

# KADI SARVA VISHWAVIDYALAYA

## **F. Suggested list of Experiments:**

List of experiments with emphasis on test kits implementation for the following communication circuits.

- 1 To generate amplitude modulation (AM) waveform and to measure modulation index of AM wave using waveform method and trapezoidal method.
- 2 To Perform Frequency Modulation (FM).
- 3 To extract information signal from the AM wave using diode detector.
- 4 To extract information signal from the FM wave using FM detector.
- 5 To study frequency response of pre-emphasis and de-emphasis circuits.
- 6 To generate SSB signal using balance modulator and single sideband filter.
- 7 To demodulate SSB signal.
- 8 To understand block diagram of super-heterodyne AM and FM receiver.
- 9 To understand working of AGC circuit.
- 10 To plot the graph of amplitude modulation using MATLAB.
- 11 To plot the graph of frequency modulation using MATLAB.
- 12 To plot the graph of AM-SSB wave using MATLAB.

## **G :Students Learning Outcomes**

On successful completion of the course The student can identify different areas of Electronic Communication. Can find the applications of all the areas in day to day life. Can identify the operations, working, etc. aspects of AM-FM modulation-demodulation types, superheterodyne principal etc.

## **H :Recommended Study Materials**

### **Text/Reference Books:**

1. Electronic Communications by Dennis Roddy & John Coolen IV Edition PHI.
2. Digital and analog communication system by B.P.Lathi .Zhi Ding (international 4th Edition), OXFORD university press.
3. Electronic Communications by Kennedy McGraw Hill Publication.