



Lok Jagruti Kendra University
University with a Difference

**Diploma
in
Electronics & Communication
Engineering**



Course Code: 025030302
Communication Engineering

Programme / Branch Name			Diploma in Electronics and Communication Engineering			
Course Name	Communication Engineering			Course Code	025030302	
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
 ESC: Engineering Science Courses PCC: Program Core Courses
 OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				Evaluation Scheme			
L	T	P	Total Credit	CCE	SEE (Th)	SEE (Pr)	Total Marks
3	0	2	4	50	50	50	150

Legends:
 L: Lectures T: Tutorial P: Practical
 CCE: Continuous & Comprehensive Evaluation
 SEE (Th): Semester End Evaluation (Theory)
 SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisite

- ✓ Physics and Mathematics (Pre-university level)
- ✓ Measure basic electrical quantities/parameters
- ✓ Use major electrical/electronic machines//instrument/equipment

3. Rationale

Wireless communication plays vital role in the field of electronic communication systems which includes radio, mobile and satellite communication systems. This requires that an electronic engineering diploma holder will have to maintain electronic communication equipment and circuits related to this area. This course is intended to lay the foundation for understanding the advanced communication courses in the subsequent semesters. Hence this course describes fundamentals of wireless communication covering analogue and digital modulation techniques. Since it is a basic core course, students should develop in depth understanding of all concepts and principles so that they may learn advance courses easily and effectively.

4. Objectives

- ✓ Understand the concept of Electronics and Communication
- ✓ Classify different types of communication system. Know the functioning of transmitter and receiver
- ✓ Understand the concept of modulation, Study Amplitude Modulation Process
- ✓ Learn about different types of AM Transmitter & receiver
- ✓ Study the Frequency Modulation Process, Learn about different types of FM Transmitters & Receivers
- ✓ Understand the concept Phase Modulation
- ✓ Explain the difference between digital and analog communication, introduction and basic types of it.

5. Contents

Unit No.	Topics	Sub-Topics	Learning Outcome	% Weightage	Hours
1	Introduction to communication system	1.1. Basics of Communication system 1.2. Modulation 1.3. Bandwidth and its requirements 1.4. Noise	<ul style="list-style-type: none"> Block diagram of communication system. Modulation: Definition & its classification Based on analog & pulse signal as carrier. Noise in communication system, classification of noise, signal to noise ratio(S/N) and noise figure. 	15	6
2	Amplitude Modulation	2.1 Introduction to Amplitude Modulation 2.2 Generation of AM wave 2.3 Concept of Single-sideband techniques	<ul style="list-style-type: none"> Amplitude modulation theory. Frequency Spectrum of the AM Wave Representation of AM Power Relation in the AM Wave Basics requirements to generate AM wave. Suppression of carrier Suppression of unwanted sideband 	25	8
3	Frequency and Phase Modulation	3.1 Introduction to Frequency and Phase modulation 3.2 Noise and Frequency Modulation 3.3 Generation of FM wave	<ul style="list-style-type: none"> Mathematical Representation of FM Frequency Spectrum of the FM Wave Phase Modulation Intersystem Comparison Pre-emphasis and De-emphasis Comparison between wideband and narrow band FM FM methods Direct methods Stabilized reactance modulator Indirect method 	15	10
4	Introduction to Digital Modulation	4.1 Sampling theorem 4.2 Nyquist criteria 4.3 Sample and hold circuit 4.4 Quantization	<ul style="list-style-type: none"> Need for sampling theorem. Describe the Nyquist criteria. Sample and Hold circuit. 	25	10

		4.5 PCM transmitter and receiver 4.6 Delta Modulation 4.7 Adaptive Delta Modulation 4.8 Differential PCM	<ul style="list-style-type: none"> • Functions of each block of pulse code modulation (PCM) transmitter and receiver. • Quantization, step - size, resolution, uniform and non- uniform quantizer, Quantization noise, Companding. • Slope overload and granular noise of delta modulation. • Differentiate Delta and adaptive delta modulation technique. • Compare the features of PCM, DM, ADM and DPCM 		
5	Digital Modulation Techniques	5.1 Amplitude Shift Keying (ASK) 5.2 Frequency Shift Keying (FSK) 5.3 Principle of Phase Shift Keying (PSK) 5.4 Quadrature Phase shift Keying (QPSK) 5.5 8ary- PSK 5.6 16-Quadrature Amplitude Modulator (QAM) 5.7 Minimum Shift Keying (MSK)	<ul style="list-style-type: none"> • Function of ASK, FSK, PSK, QPSK signal generation and detection by various Modulator and Demodulator Circuits. • Principle, constellation diagram and waveforms of 8-PSK, QAM, MSK 	20	8

Total Hours **42**

6. List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills that students can acquire the competencies/Programme outcomes. Following is the list of practical exercises for guidance.

Sr. No	Practical / Exercises	Key Competency	Hours
1	To study Block diagram of communication system	Amplitude modulation/ Demodulation trainer Kit	2
2	Measure modulation index of an AM envelope	Amplitude modulation/ Demodulation trainer Kit	2
3	Determine Modulation Index of Frequency Modulated wave.	FM trainer Kit	2
4	Obtain the frequency response of Pre-emphasis and De-emphasis circuit.	FM trainer Kit	2

5	Obtain the frequency response of Pre-emphasis and De-emphasis circuit.	Pre-emphasis and De-emphasis trainer kit	2
6	SSB-SC Modulator & Detector (Phase Shift Method)	SSB trainer Kit	2
7	DSB-SC Modulator & Detector	Balance modulator trainer kit	2
8	To study Pulse Code Modulation and	PCM trainer kit	2
9	Demodulation technique.	ASK trainer kit	
10	Check the performance of Amplitude Shift Keying modulation and demodulation.	FSK trainer kit	
11	Check the performance of Frequency Shift Keying modulation and demodulation.	PSK trainer kit	
12	Check the performance of Phase Shift Keying modulation and demodulation.	QPSK trainer kit	2
13	To Study Channel coding techniques		2
		Total Hours	20

7. Suggested Specification Table with Hours

Unit No.	Chapter Name	Teaching Hours	Distribution of Topics According to Bloom's Taxonomy					
			R %	U %	App %	C %	E %	An %
1	Introduction to communication system	6	40	20	20	0	10	10
2	Amplitude Modulation	10	20	20	15	20	20	5
3	Frequency and Phase Modulation	10	20	20	20	15	10	15
4	Introduction to Digital Modulation signal	10	20	20	15	20	10	15
5	Digital Modulation Techniques	6	30	20	20	10	10	10

Legends: R-Remembering

C- Creating

U- Understanding

E- Evaluating

App- Applying

An- Analyzing

8. Textbooks

- 1) Electronic communication Systems – Kennedy
- 2) Electronic Communication – Dennis Roddy and John colen

9. Reference Books

- 1) Analog and Digital Communication -Singal, T. L. Tata McGraw Hill, India
- 2) Electronics Communication System (Fundamental to Advance) -Wayen Tomasi Pearson Education,5th edition
- 3) Analog Communication - V.Chandra Sekar Oxford University Press
- 4) Analog Communication- Dr.Sanjay Sharma KATSON, 2012

10. Open Sources (Website, Video, Movie)



- 1) https://www.tutorialspoint.com/analog_communication/analog_communication_amplitude_modulation.html
- 2) https://en.wikipedia.org/wiki/Superheterodyne_receiver
- 3) <https://www.eeeguide.com/fm-receiver-block-diagram/>
- 4) <https://www.watelectronics.com/types-of-modulation-techniques-with-applications/>

