

CP205: COMMUNICATION PRINCIPLES & APPLICATIONS

CREDITS = 3 (L=3, T=0, P=0)

Course Objective: To prepare students with fundamentals of analog and digital communication for computer networks

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Assessment Scheme				
L	T	P	C	Theory		Practical		Total Marks
				ESE	CE	ESE	CE	100
3	0	0	3	70	30	0	0	

Course Contents:

Unit No.	Topics	Teaching Hours
1	<u>Signals and Spectra:</u> Introduction to electronics communication; Elements of communication systems; Types of communication systems; Signal classification; Periodic Analog Signals; Digital Signals; The Electromagnetic spectrum; Signal classification; Fourier series and Fourier transform; Signal transmission; filtering and convolution.	08
2	<u>Modulations and Demodulation:</u> Amplitude; frequency and phase modulation and demodulation; double-sideband modulation and demodulation; Single sideband modulation and demodulation; Modulation index and percentage of modulation; Power of modulated signal; Frequency spectra of modulated signals; AM/FM transmitter and receiver; Frequency division multiplexing; Frequency division duplex (FDD).	10
3	<u>Digital Transmission and Modulation:</u> Sampling and reconstruction; Quantization; A/D and D/A Converters ;Pulse amplitude modulation; Pulse code modulation; Time-division multiplexing; time division duplex(TDD) Line codes –NRZ; RZ; Bipolar; ASK; FSK; PSK ; QPSK and other M-ary techniques.	10
4	<u>Data Transmission and Transmission Media:</u> Parallel and Serial Transmission; Synchronous and Asynchronous Transmission; Modems; Switching; channel Capacity; Guided Media: Twisted pair cable, fiber optic cable; Unguided Media: wireless.	03
5	<u>Networking Devices:</u> Repeaters; hub; bridges; switches; routers; gateway.	03

Unit No.	Topics	Teaching Hours
6	<u>Information Theory and Coding</u> : Introduction of random variables; information content; Entropy; source coding – Hauffman and arithmetic coding; Lemple-Ziv code; Channel coding-linear block code.	09
7	<u>Case Studies of Communication Systems:</u>	03
	Total	45

List of References:

1. Frenzel. “Communication electronics, principles and applications”, Tata Mc-Graw Hill
2. Taub H. and Shilling D. L, “Principles of Communication Systems”, Tata Mc-Graw Hill
3. H P Hsu, “Analog and Digital Communications”, Tata Mc-Graw Hill
4. Haykin S. S., “An Introduction to Analog and Digital Communication Systems”, Wiley Eastern
5. Lathi B. P., “Communication Systems”, John Wiley
6. Behrouz A Forouzan, “Data Communications and Networking”, Tata Mc-Graw Hill
7. William Stallings, “Data and Computer Communications”, Pearson Education

Course Outcomes (COs):

At the end of this course students will be able to

1. Understand the basic concept of electronic communication systems
2. Illustrate time domain and frequency domain representation of signals
3. Justify the need of different types of modulation techniques for given applications
4. Choose appropriate transmission media for a given application
5. Construct appropriate source code and channel code in digital communication
6. Identify hardware and bandwidth requirements for given electronics communication systems.