Subject Name	Principles of Data Communication			
Course Type (Core/Elective)	**Core**			
Subject Code			**Credits**	3
Scheme (L-T-P)	3-0-0	**Instruction**	3 Hours/week (L) 0 Hours/week (P)	

3. Objective of the course: Exposure to fundamental concepts of signals and systems, communication technologies and information theory.

4. Outcome of the course: The students will be prepared to take courses on Computer Networks, Cyber Security and other related areas.

5. Course Plan:

Unit	Topics for Coverage
Unit 1	Signals and Transformations; Fourier Transform; LTI Systems; Convolution and LTI System Properties, Sampling theorem; Quantization – Linear, nonlinear; Pulse Code Modulation.
Unit 2	Information and Entropy: Entropy, Joint Entropy and Conditional Entropy, Relative Entropy and Mutual Information, Relationship Between Entropy and Mutual Information, Chain Rules for Entropy, Relative Entropy, and Mutual Information. Channel Capacity Coding: Source Coding- Prefix codes, Huffman Coding, Lempel Ziv Source coding Error Control Coding – Parity Check Codes, Cyclic Redundancy Checks
Unit 3	Transmission Media: Wired- Magnetic Media, Twisted Pairs, Coaxial Cable, Optical Fiber. Wireless- The Electromagnetic Spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission, Light Transmission.
Unit 4	Digital Modulation: Modulation and Demodulation of Digital modulation schemes-ASK, FSK, PSK, DPSK, QPSK. Constellation diagram, M-ary Digital carrier Modulation. Multiplexing: Frequency Division Multiplexing, Wavelength Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing, Orthogonal Frequency Division Multiplexing, Space Division Multiplexing

6. Text Books:

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, “Signals and Systems”, 2nd Edition
2. William Sinnema and Tom McGavern, “Digital, Analogue and Data Communication”, Prentice Hall.
3. Proakis, John, and Masoud Salehi. Communication Systems Engineering. 2nd ed. Upper Saddle River, NJ: Prentice Hall, 2001. ISBN: 9780130617934.

7. References:

1. B. P. Lathi et. al., Modern Digital and Analog Communication Systems 4E, Oxford Publication.
2. Haykin, Simon. Communication Systems. 5th ed. New York, NY: Wiley, 2009. ISBN: 9780470169964.