Communication Principles

Semester: IV	Subject Code: BS41606	Lectures: 60

Objectives:

The syllabus aims in equipping the students,

- To understand basics of communication systems.
- To understand modulation, demodulation and multiplexing of signals.
- To understand digital communication techniques.
- To introduce concepts in advanced wireless communication.

Unit 1: Introduction to Electronic Communication	12

- Importance of Communication, Elements of Communication system, Electromagnetic spectrum.
- Types of communication: simplex/ duplex, baseband/broadband, analog /digital, serial/Parallel communication.
- Concepts of communication system: Signal to noise ratio, Signal bandwidth, channel bandwidth, channel capacity, Nyquist theorem, data rate, baud rate,.
- Error handling code- Hamming code.

Unit 2: Modulation and Demodulation	14

- Introduction to concepts of modulation and demodulation.
- Modulation techniques: Analog modulation: Amplitude, Phase and Frequency modulation, Circuit diagram and working of transistorized amplitude modulator and diode demodulator.
- Equation of amplitude modulated wave, modulation index and frequency spectrum. (Phase and frequency modulation circuits are not expected).
- Digital modulation: Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM) , Delta modulation - Block diagram and working.
- MODEM - concept of ASK, FSK, BPSK, and QPSK, block diagram of FSK MODEM.

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Unit 3: Multiplexing and Multiple Access Techniques	10
• Concept of multiplexing and multiple access • Multiplexing techniques: Space division multiplexing, Time division multiplexing. Frequency Division Multiplexing , Code division multiplexing, spread spectrum techniques: DSSS, FHSS • Multiple access types: FDMA, TDMA, CDMA and their comparative study.	

Unit 4: Wireless Communication system	12
• Introduction to wireless communication system. Need of wireless communication systems. • Antenna – Introduction, Need, working Principle (Radiation through dipole antenna), Patch antenna. • Parameters of antenna: Gain, directivity, Radiation pattern, Beam width, Bandwidth, front to back ratio (FBR). • Concept of cellular mobile communication, Working of GSM and its features- 2G, Comparative study of 2G,3G, 4G. • Introduction to RFID, Zigbee, Bluetooth and Wi-Fi , 6 Low PAN (Comparison based on range, data rate, frequency, Power, Applications).	

***Contact hours – 12 hours**

Recommended Text / Reference Books:

1. L.E.Frenzel, ***Communication Electronics: Principles and Applications***, 3rd Edition.
2. G.M. Miller,***Mod ern Electronic Communication***, 7th Edition.
3. Jochen Schille, ***Mobile Communication*** 2nd Edition.
4. Rappaport, ***Wireless Communications, Principles and Practice***.
5. William Stallings, ***Wireless Communications and Networks How wireless works***. Preston Gralla
6. Frank Derfler Jr. Les Freed, ***How Network Works***

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