Semester III

ELECTRONICS-DSC 1C: COMMUNICATION ELECTRONICS

(Credits: Theory-04, Practicals-02)
Theory: 60 Lectures

UNIT I

Electronic communication & Analog Modulation: Introduction to communication – means and modes. Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI).Electromagnetic communication spectrum, band designations and usage.Channels and base-band signals.Concept of Noise, signal-to-noise (S/N) ratio.
Amplitude Modulation, modulation index and frequency spectrum.Generation of AM (Emitter Modulation), Amplitude Demodulation (diode detector), Concept of Single side band generation and detection. (15 Lectures)

UNIT II

Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM using VCO, FM detector (slope detector), Qualitative idea of Super heterodyne receiver

Introduction to Communication and Navigation systems: Satellite Communication: Introduction, need, Geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites. Satellite visibility, transponders (C - Band), path loss, ground station, simplified block diagram of earth 1 2 station. Uplink and downlink. (15 Lectures)

UNIT III

Analog, Pulse&Digital Modulation: Channel capacity, Sampling theorem, Basic PrinciplesPAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing
Need for digital transmission, Pulse Code Modulation, Digital Carrier Modulation Techniques, Sampling, Quantization and Encoding. Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Binary Phase Shift Keying (BPSK). (15 Lectures)

UNIT IV

Mobile Telephony System: Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, need for data encryption, architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologies, simplified block diagram of mobile phone handset, 2G, 3G and 4G concepts (qualitative only).
GPS navigation system: (qualitative idea only) (15 Lecture)

Recommended Books:

- Communication Systems, S. Haykin, 2006, Wiley India
- Electronic Communication system, Blake, Cengage, 5th edition.
- Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
- Advanced Electronics Communication Systems- Tomasi, 6th edition, Prentice Hall.

Semester III

ELECTRONICS LABORATORY DSC 1C:

LAB: COMMUNICATION ELECTRONICS

60 Lectures

AT LEAST 06 EXPERIMENTS FROM FOLLOWING

1. To design an Amplitude Modulator using Transistor
2. To study envelope detector for demodulation of AM signal
3. To study FM - Generator and Detector circuit
4. To study AM Transmitter and Receiver
5. To study FM Transmitter and Receiver
6. To study Time Division Multiplexing (TDM)
7. To study Pulse Amplitude Modulation (PAM)
8. To study Pulse Width Modulation (PWM)
9. To study Pulse Position Modulation (PPM)
10. To study ASK, PSK and FSK modulators