

| Module No. | Unit No. | Topics | Hours |
|------------|----------|---|-----------|
| 1 | | Basics of Communication System | 05 |
| | 1.1 | Block diagram, electromagnetic spectrum, signal bandwidth and power, types of communication channels, Introduction to time and frequency domain. Basic concepts of wave propagation. | 03 |
| | 1.2 | Types of noise, signal to noise ratio, noise figure, noise temperature and Friss formula. | 02 |
| 2 | | Amplitude Modulation and Demodulation | 12 |
| | 2.1 | Basic concepts, need for modulation, waveforms (time domain and frequency domain), modulation index, bandwidth, voltage distribution and power calculations. | 04 |
| | 2.2 | DSBFC: Principles, low-level and high-level transmitters, DSB suppressed carrier, Balanced modulators with diode (Ring modulator and FET) and SSB systems. | 04 |
| | 2.3 | Amplitude demodulation: Diode detector, practical diode detector, Comparison of different AM techniques, Applications of AM and use of VSB in broadcast television. | 04 |
| 3 | | Angle Modulation and Demodulation | 10 |
| | 3.1 | Frequency and Phase modulation (FM and PM): Basic concepts, mathematical analysis, FM wave (time and frequency domain), sensitivity, phase and frequency deviation, modulation index, deviation ratio, bandwidth requirement of angle modulated waves, narrowband FM and wideband FM. | 04 |
| | 3.2 | Varactor diode modulator, FET reactance modulator, stabilized AFC, Direct FM transmitter, indirect FM Transmitter, noise triangle, pre- emphasis and de-emphasis | 03 |
| | 3.3 | FM demodulation: Balanced slope detector, Foster-Seely discriminator, Ratio detector, FM demodulator using Phase lock loop, amplitude limiting and thresholding, Applications of FM and PM. | 03 |
| 4 | | Radio Receivers | 04 |
| | 4.1 | Characteristics of radio receivers, TRF, Super - heterodyne receiver block diagram, tracking and choice of IF, AGC and its types and Communication receiver. | 03 |
| | 4.2 | FM receiver block diagram, comparison with AM receiver. | 01 |
| 5 | | Analog and Digital Pulse Modulation & Demodulation | 06 |
| | 5.1 | Sampling theorem for low pass signal, proof with spectrum, Nyquist criteria, Sampling techniques, aliasing error and aperture effect. | 03 |
| | 5.2 | PAM, PWM, PPM generation, detection and applications. Basics of PCM system and differential PCM system. Concepts of Delta modulation (DM) and Adaptive Delta Modulation (ADM). | 03 |
| 6 | | Multiplexing & De-multiplexing | 02 |
| | 6.1 | Frequency Division Multiplexing transmitter & receiver block diagram and applications. Time Division Multiplexing transmitter & receiver block diagram and applications. | 02 |
| | | Total | 39 |