| **Principles of Communication Engineering** | | | | |
|---|---|---|---|---|
| CLASS S.E. ( INFORMATION TECHNOLOGY)<br>SEMESTER IV | | | | |
| HOURS PER WEEK | LECTURES | : | 04 | |
| | TUTORIALS | : | -- | |
| | PRACTICALS | : | 02 | |
| | | | **HOURS** | **MARKS** |
| EVALUATION SYSTEM: | THEORY | | 3 | 100 |
| | PRACTICAL | | 2 | |
| | ORAL | | - | |
| | TERM WORK | | - | 25 |

**1 Basic Communication Systems**:

a. Basic block diagram of communication systems.
b. Types of communication channels and their characteristics
c. Frequency / Spectrum allocations and their application areas.
d. International standards for communication systems and frequency assignment.
e. Wireless communication systems.
f. Satellite communication systems.
g. Optical fiber communication systems.

**2 Spectrum and Noise**:

a) Fourier transforms, properties, energy and power density spectrum and

applications.

b) Sources of noise – Active and passive device noise, Noise parameters like

S/N ratio, Noise factor, Noise figure, Noise factor of cascaded network,

Noise temperature, and Noise bandwidth of system.

## 3 Amplitude Modulation Techniques:

a) AM-FC spectrum, bandwidth, power calculations and block diagrams of Low level & High level modulator. (No circuit level description)

b) AM-SC spectrum, bandwidth, waveforms, generation methods. Circuits of Balanced modulator and Ring modulator.

c. SSB-SC spectrum, bandwidth, waveforms, generation methods like Filter method, Phase shift method and Third method.

d. ISB with and without Pilot carrier.

## 4 AM Receivers:

a. AM detectors – diode detector, envelope detector and their limitations.
b. TRF Receiver, Super heterodyne Receiver and Double Conversion Receiver ( only Block diagram approach)
c. Receiver parameters- sensitivity, selectivity, fidelity, SINAD and types of distortion.
d. Image frequency and its rejection and double spotting.
e. Principle of AGC and types of AGC
f. Product demodulator and Balanced demodulation of DSBSC.

## 5 FM transmission and reception:

a. Principle of FM- waveforms, spectrum, bandwidth
b. FM generation- Direct FM and Indirect FM
c. Principle of AFC
d. FM demodulation- Foster seely discriminator, Ratio detector and FM detection using PLL (only using Block diagram of PLL)
e. FM super heterodyne Receiver block diagram with waveforms.
f. Pre emphasis and de emphasis in FM, FM noise triangle
g. Comparison of AM and FM systems.

**6 Pulse Modulation Techniques**:

a. Sampling theorem for low pass signals with proof, anti aliasing filter.
b. PAM, PWM and PPM techniques (only block diagram and waveforms).
c. Source coding methods like PCM, DPCM, DM and ADM (only block diagram and waveforms)
d. Companding in PCM, Companding laws.
e. Basic digital Transmission methods- ASK, FSK and PSK with block diagram and waveforms.

**7 Multiplexing Techniques**:

a. FDM and FDMA
b. TDM and TDMA
c. Standard FDM and TDM systems ( only block diagrams and waveforms)
d. Applications in satellite communication , optical communication and wireless communication

**List of Experiments**

a. Frequency response of RF Class C Amplifier
b. AMFC generation and Demodulation
c. AMSC generation and Demodulation
d. SSBSC generation and demodulation
e. FM generation and Demodulation
f. FM demodulation using PLL
g. Sampling of Analog signals
h. Pulse Analog Modulation and demodulation
i. TDM system
j. PCM coding and decoding
k. Delta modulation and Demodulation
l. ASK,FSK and PSK encoding and decoding

Text Books:

1. Communication systems engineering John G. Proakis, Masond Saleim (Pearson education)

2. Digital and Analog communication systems Leon.w. Couch , II edition
3. B.P. Lathi, Modern Digital and Analog Communication Systems ,Third Edition, Oxford University press

**Term Work:**

Term work shall consist of at least 10 experiments and one written test.

Distribution of marks for term work shall be as follows:

| | Marks |
|---|---|
| 1. Attendance (Theory and Practical) | 05 Marks |
| 2. Laboratory work (Experiments and Journal) | 10 Marks |
| 3. Test (at least one) | 10 Marks |

The final certification and acceptance of TW ensures the satisfactory performance of laboratory Work and Minimum Passing in the term work.

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