

Course Syllabi: UEI511 Principles of Communication Engineering (L : T : P :: 3 : 1 : 0)

1. **Course number and name:** UEI511; Principles of Communication Engineering

2. **Credits and contact hours:** Credits: 3.5; Hours: 4

3. **Text book, title, author, and year**

- *Blake, R., Electronic Communication Systems, Thomson Business Information (2008).*
- *Lathi, B.P., Modern Analog and Digital Communication, Oxford University Press (2007).*
- *Kennedy, G., Electronic Communication Systems, McGraw–Hill (2002).*
- *Schweber, W., Electronic Communication Systems, Prentice–Hall of India Private Limited (2002).*

a. Other supplemental materials

- Nil

4. **Specific course information**

a. Brief description of the content of the course (catalog description)

Introduction to Electronic Communication: Evolution of Communication System, Elements of Communication systems, Types of electronic communications, Baseband signals and baseband transmission, Modulation techniques, Bandwidth requirements.

Amplitude Modulation: Introduction, Equation of AM signal, Modulation index and percentage of modulation for sinusoidal AM, Frequency spectrum of the AM wave, Representation of AM wave, Average power for sinusoidal AM wave, Effective voltage and current for sinusoidal AM, Modulation, Low and high level modulation and their comparison, Low modulator, High level modulator: Basic requirements, modulator circuits: Collector modulator Class C Amplifier, Grid Modulated Class C Amplifier, Pulse Modulated Class C Amplifier, Amplitude modulated transmitters.

Single Sideband Modulation: Introduction, Suppression of carrier, Suppression of unwanted sideband, Extensions.

AM Receivers: Functions of receivers, Types of receivers, Characteristics of radio receiver, AM receivers, Double conversion receivers, Single and independent sideband receivers, Modified system (pilot carrier SSB system).

Frequency Modulation: Frequency modulation theory, Characteristic of frequency modulation, Mathematical representation of frequency modulated wave, Frequency modulators, Pre–emphasis, De–emphasis, Directly modulated FM transmitter, Phase modulation, Indirect method of FM modulation, Wide and narrow band FM transmission, Advantages and disadvantages of FM, Comparison of FM and AM system, Comparison of FM and PM system.

FM Receiver: FM receiver, Basic FM demodulators, Noise triangle in FM, Capture effect, FM stereo system.

Pulse Modulation: Introduction, Classification of pulse modulation, Continuous vs discrete time signals, Sampling process, Pulse amplitude modulation, Pulse time modulation, Pulse position modulation, Comparison of PAM and PPM systems, Pulse code modulation, Multiplex transmission, Crosstalk, Comparison of FDM and TDM, Differential pulse code modulation, Delta modulation, Adaptive delta modulation, Sigma–delta A/D conversion, Comparison between PCM, DM, ADM and DPCM.

Audio Communication: Microphones, Loudspeakers, Speakers enclosures and baffles, High Fidelity Systems, Stereophony, Tone control circuits, Public address systems, Recent trends in sound recordings.

Telephony: Principles of telephony, Telephone transmitter and receiver, Side tone, Necessity for telephone exchange, Tones in telephony, Automatic exchange, Pulsed and DTMF dialing, Electronic telephone exchanges, E10B Electronic exchange, Teleprinters.

5. **Specific goals for the course**

After the completion of the course, the students will be able to:

- Explain the basic concepts of communication systems, various AM and FM modulators.
- Explain the working and application of AM receivers.
- Describe the working of FM receivers and their applications.
- Differentiate between various types of pulse modulation.
- Explain the working of audio communication and telephony system.

6. **Brief list of topics to be covered**

- Introduction to Electronic Communication
- Amplitude Modulation
- AM Receivers
- Frequency Modulation
- FM Receivers
- Pulse Modulation