



II Year-II Semester		<b>T</b>	<b>P</b>	<b>C</b>
		<b>4</b>	<b>0</b>	<b>3</b>
<b>ANALOG COMMUNICATIONS (RT22045)</b>				

**Prerequisite Course:**

-Nil-

**Course Outcomes:**

Upon completion of the course, the student will be able to achieve the following outcomes.

COs	Course Outcomes	POs
1	Describe the basic theory and operation of analog communication systems, especially AM modulation and demodulation with necessary mathematical expressions	3
2	Distinguish between different amplitude modulation. schemes with their advantages, disadvantages and applications	3
3	Analyze generation and detection of FM signal and comparison between amplitude and angle modulation schemes.	3
4	Understand different blocks in communication system.	3
5	Determine the signal-to-noise ratio (SNR) performance of analog communications systems.	3
6	Differentiate between different pulse modulation and demodulation techniques and signal multiplexing for various applications	3

**SYLLABUS**

**UNIT – I**

**AMPLITUDE MODULATION :** Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

**UNIT – II**

**DSB & SSB MODULATION :** Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring

Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop. Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

### **UNIT – III**

**ANGLE MODULATION** : Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

### **UNIT – IV**

**NOISE** :Noise in analog communication system, Noise in DSB&SSB System, Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis.

### **UNIT – V**

**TRANSMITTERS & RECEIVERS: Radio Transmitter** - Classification of Transmitter, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter. **Radio Receiver** - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

### **UNIT – VI**

**PULSE MODULATION** : Time Division Multiplexing, Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM, TDM Vs FDM

#### **TEXT BOOKS:**

1. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3<sup>rd</sup> Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.

#### **REFERENCES:**

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2<sup>nd</sup> Ed.
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
3. Communication Systems– R.P. Singh, SP Sapre, Second Edition TMH, 2007.
4. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.