

SSPS 426

2009-2010

**ANDHRA UNIVERSITY**  
**DEPARTMENT OF PHYSICS**  
**M.Sc PHYSICS, and SPACE PHYSICS**  
**IV SEMESTER**

(w.e.f 2009-2010 batch)

**P 403 , SP 403 COMMUNICATION ELECTRONICS**

(Common for M.Sc. Space Physics and M.Sc Physics)

**UNIT 1. CW Modulation:**

Amplitude Modulation (AM): 8 periods  
Introduction, Amplitude modulation, modulation index, Frequency spectrum, Average power for sinusoidal AM, Amplitude modulator and demodulator circuits, Double side band suppressed carrier (DSBSC) Modulation, Super heterodyne receiver.  
Single Side Band Modulation (SSB): 4 periods  
SSB principles, Balanced Modulator, SSB generation  
Angle Modulation: 8 periods  
Frequency modulation (FM), sinusoidal FM, Frequency spectrum for sinusoidal FM frequency deviation, modulation index, Average power in sinusoidal FM, FM generation  
Phase Modulation: Equivalence between PM and FM, FM detectors: Slope detector, Balanced slope detector, Foster – Seley discriminator, Ratio detector, Amplitude limiter, FM receiver.

**UNIT 2. Pulse Modulation:**

Digital Line Codes: Symbols, Functional notation for pulses, Line codes and wave forms: RZ, NRZ, Polar, Unipolar, AMI, HDBn and Manchester codes, M-ary encoding, Differential encoding 8 periods  
Sampling theorem, Principles of pulse Amplitude Modulation (PAM) and Pulse Time Modulation (PTM), Pulse code modulation (PCM), quantization, Nonlinear quantization, companding, differential pulse code modulation (DPCM), Delta Modulation (DM).  
Digital Carrier Systems: 8 periods  
ASK, PSK, FSK and DPSK

**UNIT 3. Special Communication Circuits :**


6 periods  
Tuned amplifiers : Single tuned amplifier-Hybrid  $\pi$  – equivalent for the BJT, Short circuit current gain for the BJT in CE and CB amplifiers, CE and CB tuned amplifiers, Cascode amplifier.  
Mixer Circuits : Diode mixer, IC balanced mixer.  
Filters : Active filters, Ceramic, Mechanical and crystal filters.  
Oscillators: Crystal oscillator, Voltage controlled oscillator, phase locked loop (PLL).


**UNIT 4. Noise in Communication Systems:**

8 periods  
Thermal Noise, Shot Noise, Partition noise, Signal - to - Noise ratio, Noise factor, Amplifier input noise in terms of F, Noise factor of amplifiers in cascade (Friss formula), Noise temperature, Noise in AM, Noise in FM systems. Noise in pulse modulation systems: Intersymbol interference (ISI), eye diagrams.

**Text Books:**

1. Electronic Communications D. Roody and John Coolin
2. Electronic Communications Systems G. Kennedy
3. Modern Analog & Digital Communications B.P. Lathi.

  
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