

| Course Code | Course Title | L | T | P | C |
|-------------|------------------------------|---|---|---|---|
| 1151EC109 | ANALOG COMMUNICATION SYSTEMS | 2 | 2 | 0 | 3 |

a) Course Category

Program Core

b) Preamble

This course provides introduction about all types of analog modulation and demodulation techniques and applications, also covers random process and noise performance in analog communication systems.

c) Prerequisite

Analog Electronics

d) Related Courses

Wireless Digital communication

e) Course Outcomes

Upon the successful completion of the course, students will be able to

| CO Nos. | Course Outcomes | Knowledge Level (Based on Revised Bloom's Taxonomy) |
|---------|--|--|
| CO1 | Characterize and design the behavior of amplitude modulation and detection schemes | K3 |
| CO2 | Design the various features of angle modulation and demodulation techniques and compare their performances | K3 |
| CO3 | Illustrate the influence of noise over analog modulation schemes through random process and noise theory | K3 |
| CO4 | Discuss the noise performance in AM and FM systems | K2 |
| CO5 | Explain the applications of analog communication techniques | K2 |

| f) | Correlation of COs with POs | | | | | | | | | | | | | |
|----|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| | PO 1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO | M | M | - | M | L | M | - | - | L | - | - | - | - | - |

| | | | | | | | | | | | | | | |
|---------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | |
| CO 2 | M | M | - | M | L | M | L | - | L | - | - | - | - | - |
| CO 3 | H | M | - | M | H | L | - | L | - | - | - | L | - | - |
| CO 4 | L | M | - | - | L | L | - | - | - | - | - | L | L | - |
| CO 5 | H | L | L | L | H | M | - | - | - | L | L | L | H | - |

g) Course Content

UNIT I AMPLITUDE MODULATION 12

Modulation - Need for Modulation, Principles of Amplitude Modulation: AM Envelope - Modulation Index - Frequency Spectrum and Bandwidth, Need for Frequency Translation, AM Modulator: DSBSC-SSB- VSB Modulators, AM Transmitter, Comparison of AM Modulation Systems, AM Demodulators: DSBSC- SSB, AM Receiver: TRF Receiver- Super Heterodyne Receiver- AM Peak Detector

UNIT II ANGLE MODULATION 12

Angle Modulation Types - Phase and Frequency Modulation, Narrow Band FM and Wideband FM, Transmission Bandwidth of FM signals, FM Modulator: Generation of FM by Parameter Variation Method - Armstrong's Indirect Method, PM Modulator, FM Demodulator : Frequency Discriminator - Foster Seeley Discriminator - Balanced Slope Detector, Block Diagram of FM Double Conversion Receiver, PLL as FM Demodulator – PM Demodulator

UNIT III RANDOM PROCESS / NOISE THEORY 12

Review of Probability Theory, Random Variables / Random Process, Gaussian Process, PSD Sequence of Pulse, PSD Sequence of Digital Data, Transmission of Random Process Through Linear Systems, Wiener Holph Filter, Noise: Shot Noise - Thermal Noise and White Noise - Narrow Band Noise - Noise Equivalent Bandwidth - Noise Temperature - Noise Figure

UNIT IV NOISE PERFORMANCE OF CW MODULATION SYSTEMS 12

Noise in DSBSC Systems, Noise in SSBSC System, Noise in FM System - FM Threshold Effect, Pre emphasis and De-emphasis in FM: Capture Effect – Threshold Effect, Comparison of Performances.

UNIT V APPLICATIONS OF ANALOG COMMUNICATION SYSTEM 12

Radio Transmitter and Receiver, Power Amplifier, Impedance Matching Network, Radio Receiver, Stereophonic FM Broadcasting, Voice Coders, Channel Vocoder, Linear Predictive Coder, Mobile Telephone Communication- Cellular Concept

Total 60 Hrs

h) Learning Resources

Reference Books

1. R.P Singh and S.D.Sapre “Communication Systems - Analog and Digital” Tata McGraw Hill, 2nd Edition, 2007
2. Bruce Carlson “Communication Systems” 3rd Edition, Tata McGraw Hill.
3. B.P.Lathi “Modern Digital and Analog Communication Systems” 3rd Edition, Oxford Press, 2007
4. John G. Proakis, MasoudSalehi “Fundamentals of Communication Systems” Pearson Education, 2006

Text Books

1. Herbert Taub, Donald L Schilling and Goutamsoha “Principles of Communication Systems”, 4th Edition, Tata McGraw Hill, 2014.
2. Wayne Tomasi “Electronic Communication Systems”, 5th Edition, Pearson education in south Asia print 2011
3. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley & Sons, Inc. 2001.

Online Resources

1. [http://www.talkingelectronics.com/Download%20eBooks/Principles%20of%20electronics/C H-16.pdf](http://www.talkingelectronics.com/Download%20eBooks/Principles%20of%20electronics/C%20H-16.pdf)
2. http://nptel.ac.in/courses/IITMADRAS/Principles_Of_Communication/pdf/Lecture2324_AngleModulation.pdf
3. <http://www.daenotes.com/electronics/communication-system/noise>