

**SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
(AUTONOMOUS): CHITTOOR
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

II Year B.Tech II semester

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13ECE 311 ANALOG COMMUNICATIONS

Course Educational Objectives:

- To understand the need for modulation and basics of analog communication systems through various techniques
- To have the clear insight in to the relations between the input and output ac signals in various stages of transmitter and receiver of AM and FM systems.
- To understand the performance of communication system in presence of noise.

Course Outcomes:

- ✓ Understand the performance of different modulation and demodulation techniques with respect to power and bandwidth
- ✓ Should be able to analyze the signal transmission and reception.
- ✓ Acquire knowledge about AM, FM and PM transmission and reception.
- ✓ Acquire knowledge about pulse modulation and also effect of noise in channel and systems.
- ✓ Should be able to describe the operation of Multiplexing techniques

UNIT - 1: AMPLITUDE MODULATION

Elements of communication system, Frequency spectrum and applications, Need for modulation, Time & Frequency domain analysis of AM – Power, Current, Bandwidth & Phasor Analysis, and Generation of AM: Square Law, Balanced, Switching & Transistor Modulators, Detection of AM: Square law, Envelope & Synchronous detector, Applications of AM, Need for Suppressed Carrier- Types - Percentage of Power Saving.

UNIT – 2: AMPLITUDE MODULATION WITH SUPPRESSED CARRIER

DSBSC: Time & Frequency domain analysis, Power, Current, Bandwidth & Phasor Analysis, Generation of DSBSC: Product, Balanced & Ring modulator, Detection of DSBSC: Coherent, Costas loop, Square loop & Envelope detection, QAM, Hilbert transform & Properties. **SSBSC:** Time & Frequency domain analysis – Power, Current, Bandwidth & Phasor Analysis, Generation of SSBSC: Phase, Frequency Discrimination method & Third method, Detection of SSBSC: Coherent & Envelope method. **VSBSC:** Generation of VSBSC: Phase & Frequency Discrimination method, Detection of VSBSC: Coherent & Envelope method, Applications of AM-SC Systems, Comparison between AM & AM-SC

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UNIT – 3: ANGLE MODULATION

Time & Frequency domain analysis – NBFM&WBFM, Power, Bandwidth & Phasor Analysis, Carson's rule, Comparison between NBFM & WBFM, Generation of FM waves: indirect FM and direct FM, Detection of FM: Single tuned, Balanced slope, Fosterseeley, Ratio, PLL detection, Improvement of SNR: Pre-emphasis& De-emphasis, Analysis of NBPM& WBPM, Applications of FM & PM, Comparison between AM,FM &PM .

UNIT - 4: TRANSMITTERS & RECEIVERS

Multiplexing: FDM & TDM, Transmitters: AM Transmitter: Low level& High level Modulation, FM Transmitter, Receivers: Sensitivity, Selectivity, Fidelity, AM Receiver: TRF, Super Heterodyne Receiver(SHR), Image frequency & its rejection ratio, AGC, AFC, Squelch circuit, FM Receiver .

UNIT - 5: NOISE

Introduction to noise – Types, PSD of AWGN, Noise calculations in AM: Square law & Envelope detection-Small and Large noise case – Threshold effect, Noise calculation in DSBSC & SSBSC, Noise calculations in FM & PM.

TEXT BOOKS:

1. Communication Systems, 3/e , 1996, Simon Haykins, John Wiley, New Delhi.
2. Modern digital and analog Communication systems, 3/e, 2005, B. P. Lathi, Oxford University press, New Delhi.

REFERENCE BOOKS:

1. An Introduction to Analog and Digital Communication, 2/e, 2003, Simon Haykins, John Wiley, New Delhi.
2. Principles of communication, 3/e, 2008, H. Taub and Schilling McGraw Hill, Noida.
3. Communication Systems, 2/e, 2004, Harold P.E, Stern Samy and A Mahmond, Pearson Edn, New Delhi.
4. Communication Systems: Analog and Digital Communication, 1/e, 1995, R.P Singh and S.D Sapre, McGraw Hill, Noida.
5. Analog Communications, 2/e, 2008, KN Hari Bhat & Ganesh Rao, Pearson Publications, New Delhi.