

## B.Tech III Year I Semester

## JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

19AEC55c- PRINCIPLES OF COMMUNICATIONS

(Open Elective-I)

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**Course Objectives:** The objectives of the course are to make the students learn about

- To understand the importance of modulation and Amplitude modulation.
- To know about the frequency modulation and phase modulation.
- To study different types of pulse analog modulation techniques and multiple access techniques.
- To gain knowledge on pulse code modulation and different waveform coding techniques.
- To comprehend the wireless communication systems, their evolution and standards.

**UNIT – I:**

**Analog communication-I:** Elements of communication systems need for Modulation, Modulation Methods, Baseband and carrier communication Amplitude Modulation(AM), Generation of AM signals, Rectifier detector, Envelope detector, sideband and carrier power of AM, Double side band suppressed carrier(DSB-SC) modulation & its demodulation, Switching modulators, Ring modulator, Balanced modulator, Single sideband(SSB) transmission, VSB Modulation.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Understand the basic elements of communication systems. L2
- Compare the performance of analog modulation schemes. L2

**UNIT – II:**

**Analog communication-II : Angle Modulation & Demodulation:** Concept of instantaneous frequency Generalized concept of angle modulation, Bandwidth of angle modulated waves- Narrow band frequency modulation (NBFM); and Wide band FM (WBFM), Phase modulation, Pre-emphasis & De-emphasis, Illustrative Problems.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Compare the performance of different frequency modulated schemes. L2
- Learn about the Pre-emphasis & De-emphasis circuits in frequency modulation. L1

**UNIT – III:**

**Digital communications-I (Qualitative Approach only) :Pulse Analog Modulation Techniques :** Pulse analog modulation techniques, Generation and detection of Pulse amplitude modulation, Pulse width modulation, Pulse position modulation

**Multiple Access Techniques:** Introduction to multiple access techniques, FDMA, TDMA, CDMA, SDMA: Advantages and applications

**Learning Outcomes:** At the end of this unit, the student will be able to

- Analyze the performance of different pulse modulation techniques. L4
- Understand the basic principles of Multiple Access Techniques. L2

**UNIT – IV:**

**Digital communications-II (Qualitative Approach only) :** Pulse Code Modulation, DPCM, Delta modulation, Adaptive delta modulation, Overview of ASK, PSK, QPSK, BPSK and M-PSK techniques.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Understand the performance of different types of digital modulation schemes. L2
- Explain different types of waveform coding techniques and their applications. L1

**UNIT – V:**

**Wireless communications (Qualitative Approach only) :** Introduction to wireless communication systems, Examples of wireless communication systems, comparison of 2G and 3G cellular networks, Introduction to wireless networks, Differences between wireless and fixed telephone networks, Introduction to Global system for mobile(GSM),GSM services and features.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Understand various types of wireless communication systems. **L1**
- Explain GSM services and features. **L2**

**Text Books:**

1. H Taub, D. Schilling and Gautam Sahe, “Principles of Communication Systems”, TMH, 2007, 3rd Edition
2. George Kennedy and Bernard Davis, “Electronics & Communication System”, 4th Edition, TMH 2009
3. Wayne Tomasi, “Electronic Communication System: Fundamentals Through Advanced”, 2<sup>nd</sup> editions, PHI, 2001.

**Reference Books:**

1. Simon Haykin, “Principles of Communication Systems”, John Wiley, 2nd Edition.
2. Sham Shanmugam, “ Digital and Analog communication Systems”, Wiley-India edition, 2006.
3. Theodore. S.Rappoport, “Wireless Communications”, Pearson Education, 2<sup>nd</sup> Edition, 2002.

**Course Outcomes:**

At the end of this Course the student will be able to

- Understand the importance of modulation and Amplitude modulation. **L2**
- Summarize the frequency modulation and phase modulation methods. **L2**
- Explain about different types of pulse analog modulation techniques and multiple access techniques. **L3**
- Acquire knowledge on pulse code modulation and different waveform coding techniques. **L1**
- Comprehend the wireless communication systems, their evolution and standards. **L1**

