



# GANDHI SCHOOL OF ENGINEERING

**BHABANDHA, BERHAMPUR**

**BRANCH:- ELECTRONICS & TELECOMMUNICATION ENGINEERING**

**SEMESTER:- 5<sup>TH</sup>**

**SUBJECT:- ANALOG & DIGITAL COMMUNICATION**

**Name of the Faculty- ER DEBASHREE PATNAIK**

| Topic to be taken |                                   |               |  |                                | Actual topic taken                            |  |  |         |
|-------------------|-----------------------------------|---------------|--|--------------------------------|---|--|--|---------|
| Sl. No            | Topic/Module                      | No. of period | Details of the topics  | Date                           | Topic No.                                     | Topic Name   | Date   | Remarks |
| 1                 | ELEMENTS OF COMMUNICATION SYSTEMS | 10            | 1.1 Communication Process- Concept of Elements of Communication System & its Block diagram<br>1.2 Source of information & Communication Channels.<br>1.3 Classification of Communication systems ( Line & Wireless or Radio)<br>1.4 Modulation Process, Need of modulation and classify modulation process<br>1.5 Analog and Digital Signals & its conversion.<br>1.6 Basic concept of Signals & Signals classification (Analog and Digital)<br>1.7 Bandwidth limitation | 15/09/2022<br>TO<br>30/09/2022 | 1.1<br>1.2<br>1.3<br>1.4<br>1.5<br>1.6<br>1.7 | Communication Process- Concept of Elements of Communication System & its Block diagram<br>Source of information & Communication Channels.<br>Classification of Communication systems ( Line & Wireless or Radio)<br>Modulation Process, Need of modulation and classify modulation process<br>Analog and Digital Signals & its conversion.<br>Basic concept of Signals & Signals classification (Analog and Digital)<br>Bandwidth limitation | 15/09/2022<br>16/09/2022<br>19/09/2022<br>20/09/2022 &<br>21/09/2022<br>22/09/2022 &<br>23/09/2022<br>27/09/2022 &<br>28/09/2022<br>30/09/2022 |         |

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| 2 | AMPLITUDE (LINEAR) MODULATION SYSTEM | 15 | <p>2.1 Amplitude modulation &amp; derive the expression for amplitude modulation signal, power relation in AM wave &amp; find Modulation Index.</p> <p>2.2 Generation of Amplitude Modulation(AM)- Linear level AM modulation only</p> <p>2.3 Demodulation of AM waves (liner diode detector, square law detector &amp; PLL)</p> <p>2.4 Explain SSB signal and DSBSC signal</p> <p>2.5 Methods of generating &amp; detection SSB-SC signal (Indirect method only)</p> <p>2.6 Methods of generation DSB-SC signal (Ring Modulator ) and detection of DSB-SC signal (Synchronous detection)</p> <p>2.7 Concept of Balanced modulators</p> <p>2.8 Vestigial Side Band Modulation</p> | 11/10/2022 TO 03/11/2022 | 2.1<br><br>2.2<br><br>2.3<br><br>2.4<br><br>2.5<br><br>2.6<br><br>2.7<br><br>2.8 | <p>Amplitude modulation &amp; derive the expression for amplitude modulation signal, power relation in AM wave &amp; find Modulation Index.</p> <p>Generation of Amplitude Modulation(AM)- Linear level AM modulation only</p> <p>Demodulation of AM waves (liner diode detector, square law detector &amp; PLL)</p> <p>Explain SSB signal and DSBSC signal</p> <p>Methods of generating &amp; detection SSB-SC signal (Indirect method only)</p> <p>Methods of generation DSB-SC signal (Ring Modulator ) and detection of DSB-SC signal (Synchronous detection)</p> <p>Concept of Balanced modulators</p> <p>Vestigial Side Band Modulation</p> | 11/10/2022 & 12/10/2022 & 13/10/2022<br><br>14/10/2022 & 17/10/2022<br><br>18/10/2022 & 19/10/2022 & 20/10/2022<br><br>21/10/2022 & 26/10/2022<br><br>27/10/2022<br><br>29/10/2022 & 01/11/2022<br><br>02/11/2022<br><br>03/11/2022 |  |
| 3 | ANGLE MODULATION SYSTEMS             | 10 | <p>3.1 Concept of Angle modulation &amp; its types (PM &amp; FM)</p> <p>3.2 Basic principle of Frequency Modulation &amp; Frequency Spectrum of FM Signal.</p> <p>3.3 Expression for Frequency Modulated Signal &amp; Modulation Index and sideband of FM signal</p>  | 04/11/2022 TO 21/11/2022 | 3.1<br><br>3.2   | <p>Concept of Angle modulation &amp; its types (PM &amp; FM)</p> <p>Basic principle of Frequency Modulation &amp; Frequency Spectrum of FM Signal.</p>  | 04/11/2022<br><br>09/11/2022 & 10/11/2022   |  |

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|   |                                |    | <p>3.4 Explain Phase modulation &amp; difference of FM &amp; PM)- working principle with Block Diagram</p> <p>3.5 Compare between AM and FM modulation (Advantages &amp; Disadvantages)</p> <p>3.6 Methods of FM Generation (Indirect (Armstrong) method only) working principle with Block Diagram</p> <p>3.7 Methods of FM Demodulator or detector (Forster-Seely &amp; Ratio detector)- working principle with Block Diagram</p>            |                                 | <p>3.3 Expression for Frequency Modulated Signal &amp; Modulation Index and sideband of FM signal</p> <p>3.4 Explain Phase modulation &amp; difference of FM &amp; PM)- working principle with Block Diagram</p> <p>3.5 Compare between AM and FM modulation (Advantages &amp; Disadvantages)</p> <p>3.6 Methods of FM Generation (Indirect (Armstrong) method only) working principle with Block Diagram</p> <p>3.7 Methods of FM Demodulator or detector (Forster-Seely &amp; Ratio detector)- working principle with Block Diagram</p> | <p>11/11/2022</p> <p>12/11/2022 &amp; 14/11/2022</p> <p>15/11/2022</p> <p>17/11/2022</p> <p>18/11/2022 &amp; 21/11/2022</p>                   |  |
| 4 | AM & FM TRANSMITTER & RECEIVER | 08 | <p>4.1 Classification of Radio Receivers</p> <p>4.2 Define the terms Selectivity, Sensitivity, Fidelity and Noise Figure</p> <p>4.3 AM transmitter - working principle with Block Diagram</p> <p>4.4 Concept of Frequency conversion, RF amplifier &amp; IF amplifier , Tuning, S/N ratio</p> <p>4.5 Working of super heterodyne radio receiver with Block diagram</p> <p>4.6 Working of FM Transmitter &amp; Receiver with Block Diagram.</p> | <p>22/11/2022 TO 02/12/2022</p> | <p>4.1 Classification of Radio Receivers</p> <p>4.2 Define the terms Selectivity, Sensitivity, Fidelity and Noise Figure</p> <p>4.3 AM transmitter - working principle with Block Diagram</p> <p>4.4 Concept of Frequency conversion, RF amplifier &amp; IF amplifier , Tuning, S/N ratio</p> <p>4.5 Working of super heterodyne radio receiver with Block diagram</p> <p>4.6 Working of FM Transmitter &amp; Receiver with Block Diagram.</p>  | <p>22/11/2022</p> <p>23/11/2022</p> <p>24/11/2022 &amp; 25/11/2022</p> <p>28/11/2022 &amp; 29/11/2022</p> <p>30/11/2022</p> <p>02/12/2022</p> |  |

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| 5 | ANALOG TO DIGITAL CONVERSION & PULSE MODULATION SYSTEM | 17 | <p>5.1 Concept of Sampling Theorem , Nyquist rate &amp; Aliasing</p> <p>5.2 Sampling Techniques ( Instantaneous, Natural, Flat Top)</p> <p>5.3 Analog Pulse Modulation - Generation and detection of PAM, PWM &amp; PPM system with the help of Block diagram &amp; comparison of all above.</p> <p>5.4 Concept of Quantization of signal &amp; Quantization error.</p> <p>5.5 Generation &amp; Demodulation of PCM system with Block diagram &amp; its applications.</p> <p>5.6 Companding in PCM &amp; Vocoder</p> <p>5.7 Time Division Multiplexing &amp; explain the operation with circuit diagram.</p> <p>5.8 Generation &amp; demodulation of Delta modulation with Block diagram.</p> <p>5.9 Generation &amp; demodulation of DPCM with Block diagram.</p> <p>5.10 Comparison between PCM, DM , ADM &amp; DPCM</p> | <p>05/12/2022 TO 28/12/2022</p> | <p>5.1</p> <p>5.2</p> <p>5.3</p> <p>5.4</p> <p>5.5</p> <p>5.6</p> <p>5.7</p> <p>5.8</p> <p>5.9</p> <p>5.10</p> | <p>Concept of Sampling Theorem , Nyquist rate &amp; Aliasing</p> <p>Sampling Techniques ( Instantaneous, Natural, Flat Top)</p> <p>Analog Pulse Modulation - Generation and detection of PAM, PWM &amp; PPM system with the help of Block diagram &amp; comparison of all above.</p> <p>Concept of Quantization of signal &amp; Quantization error.</p> <p>Generation &amp; Demodulation of PCM system with Block diagram &amp; its applications.</p> <p>Companding in PCM &amp; Vocoder</p> <p>Time Division Multiplexing &amp; explain the operation with circuit diagram.</p> <p>Generation &amp; demodulation of Delta modulation with Block diagram.</p> <p>Generation &amp; demodulation of DPCM with Block diagram.</p> <p>Comparison between PCM, DM , ADM &amp; DPCM</p> | <p>05/12/2022</p> <p>07/12/2022</p> <p>08/12/2022 &amp; 09/12/2022 &amp; 12/12/2022</p> <p>13/12/2022 &amp; 14/12/2022</p> <p>15/12/2022 &amp; 16/12/2022</p> <p>19/12/2022</p> <p>20/12/2022 &amp; 21/12/2022</p> <p>22/12/2022 &amp; 23/12/2022</p> <p>26/12/2022 &amp; 27/12/2022</p> <p>28/12/2022</p> |  |
| 6 | DIGITALMODULATION TECHNIQUES                           | 15 | <p>6.1 Concept of Multiplexing (FDM &amp; TDM)- ( Basic concept , Transmitter &amp; Receiver) &amp; Digital modulation formats.</p> <p>6.2 Advantages of digital communication</p>   | <p>29/12/2022 TO 19/01/2023</p> | <p>6.1</p>   | <p>Concept of Multiplexing (FDM &amp; TDM)- ( Basic concept , Transmitter &amp; Receiver) &amp; Digital modulation formats.</p>   | <p>29/12/2022 &amp; 30/12/2022</p>   |  |

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|  |  | system over Analog system   |  | 6.2  | Advantages of digital communication system over Analog system               | 02/01/2023                                       |
|  |  | 6.3 Digital modulation techniques & types.                                      |  | 6.3  | Digital modulation techniques & types.                                      | 03/01/2023                                       |
|  |  | 6.4 Generation and Detection of binary ASK, FSK, PSK, QPSK, QAM, MSK, GMSK.     |  | 6.4  | Generation and Detection of binary ASK, FSK, PSK, QPSK, QAM, MSK, GMSK.     | 04/01/2023<br>&<br>05/01/2023<br>&<br>06/01/2023 |
|  |  | 6.5 Working of T1-Carrier system.   |  | 6.5  | Working of T1-Carrier system.   | 09/01/2023                                       |
|  |  | 6.6 Spread Spectrum & its applications  |  | 6.6  | Spread Spectrum & its applications  | 10/01/2023                                       |
|  |  | 6.7 Working operation of Spread Spectrum Modulation Techniques (DS-SS & FH-SS). |  | 6.7  | Working operation of Spread Spectrum Modulation Techniques (DS-SS & FH-SS). | 12/01/2023<br>&<br>13/01/2023                    |
|  |  | 6.8 Define bit, Baud, symbol & channel capacity formula.(Shannon Theorems)      |  | 6.8  | Define bit, Baud, symbol & channel capacity formula.(Shannon Theorems)      | 16/01/2023<br>&<br>17/01/2023                    |
|  |  | 6.9 Application of Different Modulation Schemes.                                |  | 6.9  | Application of Different Modulation Schemes.                                | 18/01/2023                                       |
|  |  | 6.10 Types of Modem & its Application   |  | 6.10 | Types of Modem & its Application  | 19/01/2023                                       |



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