

### Lesson Plan

**Name of the Faculty** : Er. Sorabh Malhotra (Theory/Practical)

**Discipline** : Electronics and Communication Engineering

**Semester** : 4<sup>th</sup>

**Subject** : Digital Communication (EC-202A)  
Communication Lab (EC-204LA)

**Lesson Plan Duration** : 15 weeks (from April, 2021 to July, 2021)

**\*\*Work Load (Lecture / Practical) per week (in hours)** : Lectures-03, Practical-02

| Week            | Theory           |   | Practical       |  |
|-----------------|------------------|---|-----------------|--|
|                 | Lecture Day      | Topic (including assignment / test)                                       | Practical Day   | Topic  |
| 1 <sup>st</sup> | 1 <sup>st</sup>  | Model of Digital Communication System, Sampling Theorem                   | 1 <sup>st</sup> | 1.(a) To study Pulse Code Modulation (Sample and Hold, Quantization and Encoding using ADC)<br><br>(b) To study the basic characteristics of Low pass Filter, High Pass Filter |
|                 | 2 <sup>nd</sup>  | Sampling for baseband and bandpass signals, Natural and Flat top sampling |                 |  |
|                 | 3 <sup>rd</sup>  | Signal recovery and holding   |                 |  |
| 2 <sup>nd</sup> | 4 <sup>th</sup>  | Quantization of signal and quantization error                             | 2 <sup>nd</sup> |  |
|                 | 5 <sup>th</sup>  | Source coding, Companding   |                 |  |
|                 | 6 <sup>th</sup>  | Noise in PCM System   |                 |  |
| 3 <sup>rd</sup> | 7 <sup>th</sup>  | DPCM, ADPCM   | 3 <sup>rd</sup> | 2. To study Frequency Shift Keying (FSK), and comparison with the basic characteristics of AM, FM Modulation   |
|                 | 8 <sup>th</sup>  | APCM, Delta Modulation  |                 |  |
|                 | 9 <sup>th</sup>  | Adaptive Delta Modulation   |                 |  |
| 4 <sup>th</sup> | 10 <sup>th</sup> | Comparison of PCM, DPCM and DM, Quantization Noise                        | 4 <sup>th</sup> |  |
|                 | 11 <sup>th</sup> | Assignment-1/ Class Test  |                 |  |
|                 | 12 <sup>th</sup> | Inter-symbol interference   |                 |  |
| 5 <sup>th</sup> | 13 <sup>th</sup> | Calculation of output signal power  | 5 <sup>th</sup> | 3. To study Amplitude Shift Keying   |
|                 | 14 <sup>th</sup> | Time division multiplexed systems   |                 |  |
|                 | 15 <sup>th</sup> | Effect of thermal noise   |                 |  |
| 6 <sup>th</sup> | 16 <sup>th</sup> | O/P Signal to noise ratio in PCM, Quantization noise in DM                | 6 <sup>th</sup> | 4. To study and verify Delta Modulation Techniques   |
|                 | 17 <sup>th</sup> | O/P Signal to quantization noise ratio in DM                              |                 |  |
|                 | 18 <sup>th</sup> | Matched Filter and its properties   |                 |  |

|                  |                  |  |                  |   |
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| 7 <sup>th</sup>  | 19 <sup>th</sup> | Average probability of symbol error in binary enclosed PCM receiver                                    | 7 <sup>th</sup>  | 5.To study Phase Shift Keying (PSK)   |
|                  | 20 <sup>th</sup> | Nyquist criterion for distortionless base band binary transmission                                     |                  |   |
|                  | 21 <sup>st</sup> | Ideal Nyquist Channel, Raised cosine spectrum  |                  |   |
| 8 <sup>th</sup>  | 22 <sup>nd</sup> | Tapped delay line equalization, Adaptive equalization Correlative level coding, Duo- binary Signalling | 8 <sup>th</sup>  | Viva – Voce -1  |
|                  | 23 <sup>rd</sup> | LMS algorithm, Eye pattern   |                  |   |
|                  | 24 <sup>th</sup> | Assignment-2/ Class Test   |                  |   |
| 9 <sup>th</sup>  | 25 <sup>th</sup> | Introduction to Information, Entropy   | 9 <sup>th</sup>  | 6.Setting up a Fiber Optic Analog Link  |
|                  | 26 <sup>th</sup> | Entropy, Coding Techniques   |                  |   |
|                  | 27 <sup>th</sup> | Huffman Coding,  |                  |   |
| 10 <sup>th</sup> | 28 <sup>th</sup> | Channel Capacity   | 10 <sup>th</sup> | 7. Setting up a Fiber Optic Digital Link  |
|                  | 29 <sup>th</sup> | Linear Block Codes   |                  |   |
|                  | 30 <sup>th</sup> | Channel Coding   |                  |   |
| 11 <sup>th</sup> | 31 <sup>st</sup> | Matrix Description   | 11 <sup>th</sup> | Viva Voce-2   |
|                  | 32 <sup>nd</sup> | Syndrom Decoding, Hamming Code   |                  |   |
|                  | 33 <sup>rd</sup> | Cyclic Codes   |                  |   |
| 12 <sup>th</sup> | 34 <sup>th</sup> | Convolution Codes and its generation   | 12 <sup>th</sup> | 8.Losses in Optical Fiber<br>(a) Propagation Loss<br>(b)Bending Loss                                    |
|                  | 35 <sup>th</sup> | Viterbi decoding   |                  |   |
|                  | 36 <sup>th</sup> | Assignment-3/ Class Test   |                  |   |
| 13 <sup>th</sup> | 37 <sup>th</sup> | Pass band transmission model, gram Schmidt orthogonalization procedure                                 | 13 <sup>th</sup> | 9.To Verify Measurement of Numerical Aperture<br><br>10. To Study Time Division Multiplexing of signals |
|                  | 38 <sup>th</sup> | Geometric Interpretation of signals  |                  |   |
|                  | 39 <sup>th</sup> | Response of bank of correlators to noise input, Detection of known signal in noise                     |                  |   |
| 14 <sup>th</sup> | 40 <sup>th</sup> | Hierarchy of digital modulation techniques, BPSK, DPSK, DEPSK  | 14 <sup>th</sup> |   |
|                  | 41 <sup>st</sup> | QPSK,ASK,QASK  |                  |   |
|                  | 42 <sup>nd</sup> | FSK,M-ary FSK, MSK,  |                  |   |
| 15 <sup>th</sup> | 43 <sup>rd</sup> | M-ary QAM, Signal space diagram  | 15 <sup>th</sup> | Viva Voce-3   |

|  |                  |  |  |  |
|--|------------------|--|--|--|
|  | 44 <sup>th</sup> | Effect of intersymbol interference,<br>synchronization |  |  |
|  | 45 <sup>th</sup> | Assignment-4/ Class Test                               |  |  |

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