**GOVT. POLYTECHNIC EDUCATION SOCIETY, MANESAR**

**LESSON PLAN**

**Name of the Faculty: SH. N.K.ARORA**

**Discipline** : Electronics & Communication Engg.

**Semester** : 3rd

**Subject** : Principles of Communication Engineering

**Lesson Plan Duration:** Approx. 15 weeks (from15 Sep.2020 to16JAN. 2023) Work Load (Lecture / Practical) per week (in hours): Lectures-03, Practicals-06

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| **Week** | **Theory** | | **Practical** | |
| **Lecture Day** | **Topic (Including assignment / test)** | **Practical day** | **Topic** |
| 1st | 1st | Introduction about the  Subject/course and its syllabus. | 1st | **Group 1: Exp 1-**   1. To observe an AM wave on CRO produced by a standard signal generator using internal and external modulation. 2. To measure the modulation index of the wave obtained in above practical. |
| 2nd | **Unit-1: Introduction**  Need for modulation, frequency translation. | 2nd | **Group 2: Exp 1-**   1. To observe an AM wave on CRO produced by a standard signal generator using internal and external modulation. 2. To measure the modulation index of the wave obtained in above practical. |
| 3rd | Need for demodulation  in communication systems. |
| 2nd | 4th | Basic scheme of a  Modern communication system. | 1st | **Group 1: Exp 1- contd. & Viva** |
| 5th | **Revision** | 2nd | **Group 2: Exp 1- contd. & Viva** |
| 6th | **Unit-2: Amplitude**  **modulation**  Derivation of expression for an amplitude modulated wave. |
| 3rd | 7th | Carrier and side band  components, Modulation index | 1st | **Group 1: Exp 2**   1. To obtain an AM wave from a square law modulator circuit and observe waveforms. 2. To measure the modulation index of the obtained wave form. |
| 8th | Spectrum and BW of AM Wave. | 2nd | **Group 2: Exp 2**   1. To obtain an AM wave from a square law modulator circuit and observe waveforms. 2. To measure the modulation index of the obtained wave form. |
| 9th | Relative power  distribution in carrier and side bands. |
| 4th | 10th | Elementary idea of  DSB-SC, SSB-SC, ISB  and VSB modulations | 1st | **Group 1: Exp 2 contd. & Viva** |
| 11th | Elementary idea of DSB-SC, SSB-SC, ISB | 2nd | **Group 2: Exp 2 contd. & Viva** |

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|  |  | and VSB modulations contd. |  |  |
| 12th | Comparison of various  AM systems and areas of applications. |
| 5th | 13th | **Revision & Assignment** | 1st | **Group 1: Exp 3**  To obtain an FM wave and measure the frequency deviation for different modulating signals. |
| 14th | **Unit-3: Frequency**  **modulation**  Expression for  frequency modulated  wave and its frequency spectrum | 2nd | **Group 2: Exp 3**  To obtain an FM wave and measure the frequency deviation for different modulating signals. |
| 15th | Modulation index,  maximum frequency deviation and deviation ratio |
| 6th | 16th | BW of FM signals,  Carson’s rule. | 1st | **Group 1: Exp 3 Revision & Viva** |
| 17th | Effect of noise on FM carrier, Noise triangle | 2nd | **Group 2: Exp 3 Revision & Viva** |
| 18th | Role of limiter, Need for  pre-emphasis and de- emphasis, capture effect. |
| 7th | 19th | Comparison of FM and AM in communication systems | 1st | **Group 1: Exp 4**  To obtain modulating signal from an AM detector  circuit and observe the pattern for different RC time constants and obtain its optimum value for least distortion. |
| 20th | **Revision and class test/quiz.** | 2nd | **Group 2: Exp 4**  To obtain modulating signal from an AM detector circuit and observe the pattern for different RC time  constants and obtain its optimum value for least distortion. |
| 21st | **Unit-4: Phase**  **modulation**  Derivation of expression for phase modulated  wave, modulation index |
| 8th | 22nd | Comparison with frequency modulation | 1st | **Group 1: Exp 4 Revision & Viva** |
| 23rd | **Unit-5: Principles of**  **AM Modulators**  Circuit Diagram and working operation of  Collector Modulator | 2nd | **Group 2: Exp 4 Revision & Viva** |
| 24th | Base Modulator |
| 9th | 25th | Square Law Modulator | 1st | **Group 1: Exp 5**  To obtain modulating signal from FM detector. |
| 26th | Balanced Modulator,  **Revision and Assignment** | 2nd | **Group 2: Exp 5**  To obtain modulating signal from FM detector. |
| 27th | **Unit-6: Principles of**  **FM Modulators** Working principles and applications of reactance modulator |
| 10th | 28th | Varactor diode  modulator | 1st | **Group 1: Exp 5 Revision** |
| 29th | VCO Modulator | 2nd | **Group 2: Exp 5 Revision** |
| 30th | Armstrong phase modulator |

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| 11th | 31st | Stabilization of carrier  using AFC (Block diagram approach) | 1st | **Group 1: Exp 6**  To observe the sampled signal and compare it with the analog input signal. Note the effect of varying the sampling pulse width and frequency on the sampled output. |
| 32nd | **Revision and class test/quiz.** | 2nd | **Group 2: Exp 6**  To observe the sampled signal and compare it with the analog input signal. Note the effect of varying  the sampling pulse width and frequency on the sampled output. |
| 33rd | **Unit-7: Demodulation**  **of AM Waves**  Principles of  demodulation of AM wave |
| 12th | 34th | Diode detector circuit | 1st | **Group 1: Exp 6 contd. &Viva** |
| 35th | Concept of Clipping | 2nd | **Group 2: Exp 6 contd. &Viva** |
| 36th | Formula for RC time  constant for minimum distortion (no derivation) |
| 13th | 37th | **Revision & Assignment** | 1st | **Group 1: Exp 7**  To observe and note the pulse amplitude modulated signal (PAM) and compare them with the corresponding analog input signal. |
| 38th | **Unit-8: Demodulation**  **of FM Waves**  Basic principles of FM detection using slope  detector | 2nd | **Group 1: Exp 7**  To observe and note the pulse amplitude modulated signal (PAM) and compare them with the corresponding analog input signal. |
| 39th | Principle of working of  Foster-Seeley discriminator |
| 14th | 40th | Ratio detector | 1st | **Group 1: Exp 7 contd.** |
| 41st | Block diagram of Phase locked Loop (PLL) FM  demodulators | 2nd | **Group 1: Exp 7 contd.** |
| 42nd | **Unit-9: Pulse**  **Modulation**  Statement of sampling theorem and elementary idea of sampling frequency for pulse  modulation |
| 15th | 43rd | Basic concept of time  division multiplexing (TDM) | 1st | **Group 1: Exp 8**  To observe PPM and PWM signal and compare it with the analog input signal. |
| 44th | Frequency division  multiplexing (FDM) | 2nd | **Group 2: Exp 8**  To observe PPM and PWM signal and compare it with the analog input signal. |
| 45th | Pulse Amplitude Modulation (PAM) |
| 16th | 46th | Pulse Position  Modulation (PPM) | 1st | **Revision & Viva** |
| 47th | Pulse Width Modulation  (PWM) | 2nd | **Revision & Viva** |
| 48th | **Revision and class test/quiz.** |