## Government Polytechnic, Mandi Adampur

Name of Faculty: Sh. Ravinder Kumar

Discipline: Electronics

Semester: 3

Subject: Principles of Communication Engineering

Lesson Plan Duration: 18 Week

| Week | Theory | | Practical Day |
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| | **Lecture Day** | **Topic** | |
| **Week 1** | Day 1 | **Unit 1: Introduction, Need for modulation** | day 1 |
| | Day 2 | frequency translation and demodulation in communication systems | |
| | Day 3 | Basic scheme of a modern communication system | |
| **Week 2** | Day 4 | **Test Unit 1** | day 2 |
| | Day 5 | **Unit 2: Amplitude modulation** | |
| | Day 6 | Derivation of expression for an amplitude modulated wave | |
| **Week 3** | Day 7 | Carrier and side band components. | day 3 |
| | Day 8 | Modulation index.  Spectrum and BW of AM Wave | |
| | Day 9 | Relative power distribution in carrier and side bands | |
| **Week 4** | Day 10 | Elementary idea of DSB-SC, SSB-SC, ISB | day 4 |
| | Day 11 | VSB modulations, their comparison, and areas of applications | |
| | Day 12 | **Test Unit 2** | |
| **Week5** | Day 13 | **Unit 3: Frequency modulation** | day 5 |
| | Day 14 | Expression for frequency modulated wave and its frequency spectrum (without Proof and analysis of Bassel function) | |
| | Day 15 | Modulation index | |
| **Week 6** | Day 16 | maximum frequency deviation and deviation ratio | day 6 |
| | Day 17 | BW of FM signals, Carson's rule | |
| | Day 18 | Effect of noise on FM carrier.  Noise triangle | |
| **Week 7** | Day 19 | Role of limiter, Need for pre-emphasis and de-emphasis | day 7 |
| | Day 20 | capture effect. | |
| | Day 21 | Comparison of FM and AM in communication systems | |
| **Week 8** | Day 22 | **Test Unit 3** | day 8 |
| | Day 23 | **Unit 4: Phase modulation** | |
| | Day 24 | Derivation of expression for phase modulated wave | |
| | Day 25 | modulation index | day 9 |

| | Day 26 | comparison with frequency modulation | |
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| | Day 27 | **Test Unit 4** | |
| **Week 10** | Day 28 | **Unit 5: 5. Principles of AM Modulators** | day 10 |
| | Day 29 | Circuit Diagram and working operation of Collector and Base Modulator | |
| | Day 30 | Circuit Diagram and working operation of Low Modulator | |
| **Week 11** | Day 31 | Circuit Diagram and working operation of Balanced Modulator | day 11 |
| | Day 32 | **Test Unit 5** | |
| | Day 33 | **Unit 6: Principles of FM Modulators** | |
| **Week 12** | Day 34 | Working principles and applications of reactance modulator | day 12 |
| | Day 35 | varactor diode modulator | |
| | Day 36 | VCO and Armstrong phase modulator | |
| **Week 13** | Day 37 | Stabilization of carrier using AFC (Block diagram approach) | day 13 |
| | Day 38 | **Test Unit 6** | |
| | Day 39 | **Unit 7: Demodulation of AM Waves** | |
| **Week 14** | Day 40 | principles of demodulation of AM wave using diode detector circuit | day 14 |
| | Day 41 | concept of Clipping and formula for RC time constant for minimum distortion (no derivation) | |
| | Day 42 | **Test Unit 7** | |
| **Week 15** | Day 43 | **Unit 8: Demodulation of FM Waves** | day 15 |
| | Day 44 | -     Basic principles of FM detection using slope detector | |
| | Day 45 | Principle of Working of the following FM demodulators<br><br>i. Foster-Seeley discriminator | |
| **Week 16** | Day 46 | ii. Ratio detector | day 16 |
| | Day 47 | <br>iii. Block diagram of Phase locked Loop (PLL) FM demodulators (No Derivation) | |
| | Day 48 | **Test Unit 8** | |
| **Week 17** | Day 49 | **Unit 9: Pulse Modulation** | day 17 |
| | Day 50 | <br>Statement of sampling theorem and elementary idea of sampling frequency for pulse modulation | |
| | Day 51 | -     Basic concepts of time division multiplexing (TDM) and frequency division multiplexing (FDM) | |
| **Week 18** | Day 52 | Pulse Amplitude Modulation (PAM), Pulse Position Modulation (PPM) | day 18 |
| | Day 53 | Pulse Width Modulation (PWM). | |
| | Day 54 | **Test Unit 9** | |

| **Practical** |
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| **Topic** |
| To observe an AM wave on CRO produced by a standard signal generator using internal and external modulation |
| To measure the modulation index of the wave obtained in above practical |
| File Check |
| To obtain an AM wave from a square law modulator circuit and observe waveforms |
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| To measure the modulation index of the obtained wave form. |
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| To obtain an FM wave and measure the frequency deviation for different modulating signals. |
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| To obtain modulating signal from an AM detector circuit and observe the pattern for different RC time | |
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| To obtain modulating signal from FM detector. | |
| 6. To observe the sampled signal and compare it with the analog input signal. Note the effect of varying | |
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| To observe and note the pulse amplitude modulated signal (PAM) and compare them with the corresponding analog input signal | |
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| 8. To observe PPM and PWM signal and compare it with the analog input signal | |
| File check | |