**Lesson Plan**

**Name of the Faculty** **:** Er. Vijay Kumar Anand

**Discipline** **:** Electronics and Communication Engineering

**Semester** **:** 4th

**Subject** **:** Analog Circuits (EC-206A)

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

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

| Week | Theory | | Practical | |
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| | Lecture Day | Topic (including assignment / test) | Practical Day | Experiment |
| 1st | 1st | Introduction to Analog Electronics, Course Objectives and Outcomes. | 1st | Design a simple common emitter (CE) amplifier Circuit using BJT and find its gain and frequency response. |
| | 2nd | Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier. | | |
| | 3rd | Biasing schemes for BJT and FET amplifiers | | |
| 2nd | 4th | Bias stability, various configurations (such as CE/CS, CB/CG, CC/CD) and their features | 2nd | Design a BJT Emitter follower and determination of the gain, input and output impedances |
| | 5th | Various configurations (such as CE/CS, CB/CG, CC/CD) and their features | | |
| | 6th | Small signal analysis of BJT Amplifier | | |
| 3rd | 7th | Low frequency transistor models | 3rd | Design a differential amplifier using BJT and calculate its gain and frequency response |
| | 8th | Estimation of voltage gain, input resistance, output resistance | | |
| | 9th | Design procedure for particular specifications | | |
| 4th | 10th | Low frequency analysis of MSA | 4th | Viva Voce 1 |
| | 11th | Derivation of gain, cut off frequencies | | |

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| | 12th | Assignment 1/ Class Test | | |
| 5th | 13th | High frequency transistor models. | 5th | Design a single stage common emitter transistor amplifies using BC107 with $V_{CC}$=12V, $V_{CEQ}$=5V, $V_E$=3V, $R_L$=47K and $f_L$=100Hz |
| | 14th | Frequency response of single stage Amplifier | | |
| | 15th | Frequency response of multistage amplifiers, | | |
| 6th | 16th | Cascode amplifier | 6th | Design a RC coupled Single stage BJT amplifier and determination of the gain, frequency response, input and output impedances |
| | 17th | Class A power amplifier its power, efficiency and linearity issues | | |
| | 18th | Class B power amplifier its power, efficiency and linearity issues | | |
| 7th | 19th | Class AB power amplifier its power, efficiency and linearity issues | 7th | Design a self bias circuit for an NPN silicon transistor having $h_{fe}$=100 and $V_{be}$=0.6V. The desired Q-point is $V_{ce}$=5V and $I_c$=1mA and S<or equal to 8. Assume $V_{cc}$=10V and $R_E$ =1KΩ |
| | 20th | Class C power amplifier its power efficiency and linearity issues | | |
| | 21st | Assignment 2/ Class test | | |
| 8th | 22nd | Feedback Topologies**:** Voltage series, current series, voltage shunt, current shunt | 8th | Viva-Voce 2 |
| | 23rd | Effect of feedback on gain, bandwidth calculation with practical circuits | | |
| | 24th | Concept of stability | | |
| 9th | 25th | Gain margin and phase margin. | 9th | Design and test the performance of BJT-RC Phase shift Oscillator for f0 ≤ 10 KHz |
| | 26th | Oscillators: Barkhausen's criterion, Sinusoidal oscillators | | |
| | 27th | Phase shift oscillator | | |
| 10th | 28th | Wein Bridge oscillator | 10th | Design and test the performance of BJT –Colpitt Oscillators for RF range f0 ≥100KHz. |
| | 29th | Resonant circuit oscillator, a general form of oscillator | | |
| | 30th | Crystal oscillator | | |
| 11th | 31st | LC oscillators : Hartley oscillator | 11th | Design and test the performance of BJT –Hartley Oscillators for RF range f0 ≥100KHz. |
| | 32nd | Colpitt oscillator | | |
| | 33rd | Clapp oscillator | | |

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| 12th | 34th | Assignment 3/Class test | 12th | Design Schmitt trigger using op-amp and verify its operational characteristics |
| | 35th | Op-Amp Applications: Schmitt trigger and its applications | | |
| | 36th | Current mirror: Basic topology and its variants, V-I characteristics, | | |
| 13th | 37th | Output resistance and minimum sustainable voltage (VON), maximum usable load | 13th | Design an astable multivibrator using 555 timer. |
| | 38th | Differential amplifier: Basic structure and principle of operation | | |
| | 39th | Calculation of differential gain | | |
| 14th | 40th | Common mode gain, CMRR and ICMR | 14th | Design a monostable multivibrator using 555 timer |
| | 41st | OP-AMP design: design of differential amplifier for a given specification | | |
| | 42nd | Design of gain stages | | |
| 15th | 43rd | Design of output stage | 15th | Viva-Voce 3 |
| | 44th | Revision/Quiz | | |
| | 45th | Revision/Class test | | |

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