**LESSON PLAN**

|  |  |  |
| --- | --- | --- |
| **Discipline:**  ET & C. Engg. | **Semester:**  Forth (4th) | **Name of the Faculty:**  Er Debasmita Mohapatra |
| **Subject:**  Analog Electronics & Linear IC (Th-4) | **No. of days/week class allotted:**  Six (6) | **Semester from Date16.01.24 : to Date:26.04.24**  **No. of Weeks:** 15 |
| **WEEK** | **CLASS DAY** | **THEORY TOPICS** |
| 1st | 1st | **Unit No.- 01** **(DIODE, TRANSISTORS AND CIRCUITS)** Introduction to Analog Electronics |
| 2nd | Working principle, of Diode & its current equation, Specification and use of p-n junction diode. |
| 3rd | Breakdown of diode (Avalance & Zener Breakdown) and Construction, working, Characteristics. |
| 4th | Classification of Rectifiers and working of different types of Rectifiers- Half-Wave Rectifier. |
| 5th | Full-Wave Rectifier (CT & BRIDGE type) |
| 6th | Working principle of p-n-p and n-p-n transistor. |
| 2nd | 1st | Different types of transistor connection (CB, CE and CC)& input and output characteristics of transistor in different connections. |
| 2nd | Define ALPHA, BETA and GAMMA of transistors in various modes. Establish the Mathematical relationship between them. |
| 3rd | Basic concept of Biasing, Types of Biasing,h-parameter model of BJT,load line (AC &DC) and determine the Q-point. |
| 4th | Types of Coupling, working principle and use of R-C Coupled Amplifier & Frequency Responses of R-C coupled Amplifier & draw the curve. |
| 5th | ***Possible Question Answer Discussion*** |
| 6th | **Unit No.- 02 (AUDIO POWER AMPLIFIERS)**  Classify Power Amplifier |
| 3rd | 1st | &Differentiate between Voltage and Power Amplifier. |
| 2nd | Working principle of different types of Power Amplifier (Class-A) |
| 3rd | Working principle of different types of Power Amplifier( Class-AB). |
| 4th | Working principle of different types of Power Amplifier Class-B and Class-C) |
| 5th | Working principle of different types of Power Amplifier( Class D amplifier). |
| 6th | Construction and working principle and advantages of Push Pull (Class-B) Amplifiers. |
|  | 1st | Cont…. |
| 2nd | ***Possible Question Answer Discussion*** |
| 4th | 3rd | **Monthly Test-1** |
| 4th | **Unit No.- 03 (FET)**FET & its classifications . |
|  | 5th | &Differentiate between JFET & BJT. |
| 6th | Construction, working principle & characteristics of JEFT. |
| 5th | 1st | &Explain JEFT as an amplifier. |
| 2nd | Parameters of JFET . |
| 3rd | & Establish relation among JFET parameters. |
| 4th | Construction & working principle MOSFET |
| 5th | & its classification & characteristics (Drain & Transfer) |
| 6th | Explain the operation of CMOS, VMOS. |
| 6th | 1st | & LDMOS. |
| 2nd | ***Possible Question Answer Discussion*** |
| 3rd | **Unit No.- 04(FEED BACK AMPLIFIER & OSCILLATOR)**Define & classify Feedback Amplifier, principle of negative feedback with the help of block diagram |
| 4th | Types of feedback – negative &positive feedback. |
| 5th | Types of negative feedback – voltage shunt, voltage series, current shunt& current series and characteristics voltage gain. |
| 6th | Bandwidth, input Impedance output impedance, stability, noise, distortion in amplifiers. |
| 7th | 1st | Oscillator -block diagram of sine wave oscillator. |
| 2nd | Types Requirement of oscillation-Barkhuisen criterion. |
| 3rd | RC oscillators – RC phase shift ,Crystal, LC oscillators – Colpitts , Hartley & Wien Bridge Oscillators . |
| 4th | Circuit operation, circuit diagram, equation for frequency of oscillation & frequency stability. |
| 5th | ***Possible Question Answer Discussion*** |
| 6th | **Monthly Test-2** |
| 8th | 1st | **Unit No.- 05(TUNED AMPLIFIER & WAVE SHAPING CIRCUIT)**Defined and classify Tuned amplifier, |
| 2nd | Explain parallel Resonant circuit, Resonance Curve & sharpness of Resonance. |
| 3rd | working principle of Single tuned Voltage& Double tuned Amplifier. |
| 4th | Its limitation |
| 5th | Different type of Non-linear circuits - Clipper, diode series &shunt, |
| 6th | positive& negative biased & unbiased . |
| 9th | 1st | Combinational clipper clippers circuit & its application. |
| 2nd | Different type of Clamper circuit (positive & negative clampers) & its application. |
| 3rd | Working of Astable, Monostable Multivibrator with circuit diagram. |
| 4th | & BistableMultivibrator with circuit diagram. |
| 5th | Working& use of Integrator and Differentiator circuit using R- C circuit(Linear). |
|  | 6th | **Monthly Test-3** |
| 10th | 1st | Input / output waveforms & frequency response. |
| 2nd | ***Possible Question Answer Discussion*** |
| 3rd | **Unit No.- 06 (OPAM CKT & FEEDBACK CONFIGURATION)** Differential amplifier |
| 4th | Explain its configuration &significance. |
| 5th | Block diagram representation of a typical Op- Amp. |
| 6th | Its equivalent circuits and draws the schematic symbol. |
| 11th | 1st | Discuss the types of integrated circuits manufacturer’s designations of ICs, Packagetypes. |
| 2nd | Pin identification and temperature and ordering information. |
| 3rd | Define the following electrical characteristics input offset voltage, input offset current. |
| 4th | CMMR, Large signal voltage gain, Slew rate . |
| 5th | Draw and explain the Open Loop configuration (inverting Amplifier) |
| 6th | **Monthly Test-4** |
| 12th | 1st | Draw and explain the Open Loop configuration (non-inverting Amplifier) |
| 2nd | Draw the circuit diagram of the voltage series feedback amplifier and derive the close loop Voltage gain. |
| 3rd | Gain of feedback circuits input resistance, and output resistance, bandwidth and total output offset voltage with feedback. |
| 4th | Draw the circuit diagram of the voltage shunt feedback amplifier and derive the close loop, Voltage gain. |
| 5th | Gain of feedback circuits and input resistance, and output resistance, bandwidth and total output offset voltage with feedback. |
| 6th | ***Possible Question Answer Discussion*** |
| 13th | 1st | **Unit No.- 07(APPLICATION OF OPERATIONAL AMPLIFIER,TIMER CKTS&IC VOLTAGE REGULATOR)**  Discuss the summing scaling and averaging of inverting and non-inverting amplifiers. |
| 2nd | DC & AC Amplifies using OP-AMP. |
| 3rd | Integrator and differentiator using op-amp. |
| 4th | Active filter and describe the filter design of fast order low Pass Butterworth. |
| 5th | Concept of Zero-Crossing Detector using Op-Amp |
| 6th | Block diagram and operation of IC 555 timer &IC 565 PLL& its applications. |
| 14th | 1st | Working of Current to voltage Convertor using Operational Amplifier |
| 2nd | Working of the Voltage to Frequency Convertor using Operational Amplifier. |
| 3rd | Working of the Frequency to Voltage Conversion using Operational Amplifier. |
| 4th | Operation of power supply using 78XX and 79XX, Series with their PIN configuration. |
| 5th | Operation of power supply using LM 317 Series with their PIN configuration. |
| 6th | Functional block diagram & Working of IC regulator LM 723 |
| 15th | 1st | Functional block diagram & Working of IC regulator LM 317. |
| 2nd | ***Possible Question Answer Discussion*** |
| 3rd | Review Class for Chapter No.- 01 |
| 4th | Review Class for Chapter No.- 02 |
| 5th | Review Class for Chapter No.- 03 |
| 6th | Review Class for Chapter No.- 04 |

Coverage of Syllabus up to Internal Exam (I.A.)- Chapers-1,2,3&4.