

GOVERNMENT POLYTECHNIC, SAMBALPUR, RENGALI

DEPARTMENT OF E&TC ENGINEERING

LESSON PLAN

SUBJECT- ANALOG ELECTRONICS & LINEAR IC (TH-4)

SEMESTER-4TH

NAME OF THE FACULTY- Mr. Rajat ku. Dutta

TOTAL NO. OF PERIODS-75(5/W)

| UNIT | DATE | PERIOD | TOPICS TO BE COVERED |
|-------------|--|---------------|--|
| 1 | 1 st week of February, 2023 | | DIODE, TRANSISTORS AND CIRCUITS |
| | | 1 | Working principle, of Diode & its current equation, Specification and use of p-n junction diode |
| | | 2 | Breakdown of diode (Avlance & Zener Breakdown) and Construction, working, Characteristics |
| | | 3 | Classification of Rectifiers and working of different types of Rectifiers- Half-Wave Rectifier, Full-Wave Rectifier (CT & BRIDGE type) |
| | | 4 | Working principle of p-n-p and n-p-n transistor, different types of transistor connection (CB, CE and CC) & input and output characteristics of transistor in different connections |
| | | 5 | Define ALPHA, BETA and GAMMA of transistors in various modes. Establish the Mathematical relationship between them |
| | | 6 | Basic concept of Biasing, Types of Biasing, h-parameter model of BJT, load line (AC &DC) and determine the Q-point |
| | | 7 | Types of Coupling, working principle and use of R-C Coupled Amplifier & Frequency Responses of R-C coupled Amplifier & draw the curve |
| | | 8 | Previous year questions discussion & assignments. |
| 2 | 1st week of March,2023 | | AUDIO POWER AMPLIFIERS |
| | | 1 | Classify Power Amplifier & Differentiate between Voltage and Power Amplifier |
| | | 2 | Working principle of different types of Power Amplifier (Class-A, Class-AB, Class-B and Class-C & Class D amplifier) |
| | | 3 | Construction and working principle and advantages of Push Pull (Class-B) Amplifiers |
| | | 4 | Previous year questions discussion & assignments. |
| 3 | 4th week of March,2023 | | FIELD EFFECT TRANSISTOR (FET) |
| | | 1 | FET & its classifications & Differentiate between JFET & BJT |
| | | 2 | Construction, working principle & characteristics of JEFT & Explain JEFT as an amplifier, parameters of JFET & Establish relation among JFET parameters |
| | | 3 | Construction & working principle MOSFET & its classification & characteristics (Drain & Transfer) |
| | | 4 | Explain the operation of CMOS, VMOS & LDMOS |
| | | 5 | Previous year questions discussion & assignments. |
| 4 | 3rd week of April,2023 | | FEED BACK AMPLIFIER & OSCILLATOR |
| | | 1 | Define & classify Feedback Amplifier, principle of negative feedback with the help of block diagram, Types of feedback – negative & positive feedback |
| | | 2 | Types of negative feedback – voltage shunt, voltage series, current shunt & current series and characteristics voltage gain, bandwidth , input Impedance output impedance, stability, noise , distortion in amplifiers |
| | | 3 | Oscillator -block diagram of sine wave oscillator ,Types Requirement of oscillation Bark-hausen criterion |

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| | | 4 | RC oscillators – RC phase shift ,Crystal, LC oscillators – Colpitts , Hartley & Wien Bridge Oscillators :Circuit operation, circuit diagram, equation for frequency of oscillation & frequency stability |
| | | 5 | Previous year questions discussion & assignments. |
| 5 | 1 st week of May,2023 | | TUNED AMPLIFIER & WAVE SHAPING CIRCUIT |
| | | 1 | Defined and classify Tuned amplifier, Explain parallel Resonant circuit, Resonance Curve & sharpness of Resonance |
| | | 2 | 5.2 working principle of Single tuned Voltage& Double tuned Amplifier & its limitation |
| | | 3 | 5.3 Different type of Non-linear circuits - Clipper, diode series & shunt, positive& negative biased & unbiased and combinational clipper clippers circuit & its application. |
| | | 4 | 5.4 Different type of Clamper circuit (positive & negative clampers) & its application. |
| | | 5 | 5.5 Working of Astable, Monostable & Bistable Multivibrator with circuit diagram. |
| | | 6 | 5.6 Working& use of Integrator and Differentiator circuit using R- C circuit (Linear), input / output waveforms & frequency response. |
| | | 7 | Previous year questions discussion & assignments |
| 6 | 3 rd week of May,2023 | | OPERATIONAL AMPLIFIER CIRCUITS & FEEDBACK CONFIGURATIONS |
| | | 1 | Differential amplifier & explain its configuration & significance |
| | | 2 | Block diagram representation of a typical Op- Amp, its equivalent circuits and draw the schematic symbol |
| | | 3 | Discuss the types of integrated circuits manufacturer's designations of ICs, Package types, pin identification and temperature and ordering information |
| | | 4 | Define the following electrical characteristics input offset voltage, input offset current, CMMR, Large signal voltage gain, Slew rate |
| | | 5 | Draw and explain the Open Loop configuration (inverting, non-inverting Amplifier) |
| | | 6 | Draw the circuit diagram of the voltage series feedback amplifier and derive the close loop Voltage gain, gain of feedback circuits input resistance, and output resistance, bandwidth and total output offset voltage with feedback |
| | | 7 | Draw the circuit diagram of the voltage shunt feedback amplifier and derive the close loop, Voltage gain, gain of feedback circuits and input resistance, and output resistance, bandwidth and total output offset voltage with feedback |
| | | 8 | Previous year questions discussion & assignments |
| 7 | 2 nd week of June,2023 | | APPLICATION OF OPERATIONAL AMPLIFIER, TIMER CIRCUITS& IC voltage regulator |
| | | 1 | Discuss the summing scaling and averaging of inverting and non-inverting amplifiers |
| | | 2 | DC & AC Amplifiers using OP-AMP. |
| | | 3 | Integrator and differentiator using op-amp |
| | | 4 | Active filter and describe the filter design of fast order low Pass Butterworth |
| | | 5 | Concept of Zero-Crossing Detector using Op-Amp |
| | | 6 | Block diagram and operation of IC 555 timer & IC 565 PLL& its applications. |
| | | 7 | Working of Current to voltage Convertor using Operational Amplifier |
| | | 8 | Working of the Voltage to Frequency Convertor using Operational Amplifier |
| | | 9 | Working of the Frequency to Voltage Conversion using Operational Amplifier |
| | | 10 | Operation of power supply using 78XX and 79XX, LM 317 Series with their PIN configuration |

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| | | 11 | Functional block diagram & Working of IC regulator LM 723 & LM 317 |
| | | 12 | Previous year questions discussion & assignments |