# DEPARTMENT OF ELECTRICAL ENGINEERING
# Govt. Polytechnic Jajpur, Ragadi

**LESSON PLAN {SESSION 2024-25 (SUMMER)**
**TH2. ANALOG ELECTRONICS AND OP-AMP**

| | |
|---|---|
| **Course Code: TH-2** | **Semester: 4TH** |
| **Total Periods: 60** | **Examination: 3 Hours** |
| **Theory Periods: 4 P/Week** | **Internal Assessment: 20 Marks** |
| **Maximum Marks: 100** | **End Semester Examination: 80 Marks** |
| **Semester From Date: 04/02/2025 To 17/05/2025** | **Name Of Teaching Faculty: Sri. Prasanta Kumar Mohapatra** |

| **TOPICS TO BE COVERED** | | |
|---|---|---|
| 1st Week | 1 | **P-N Junction Diode**, Working of Diode, V-I characteristic of PN junction Diode |
| | 2 | DC load line Important terms such as Ideal Diode, Knee voltage, Junctions breakdown, |
| | 3 | Zener breakdown, Avalanche breakdown, |
| | 4 | P-N Diode clipping Circuit |
| 2nd Week | 5 | P-N Diode clipping Circuit |
| | | P-N Diode clamping Circuit |
| | 6 | P-N Diode clamping Circuit |
| | | **Special Semiconductor Device:** Thermistors, |
| | 7 | Sensors & Barretters |
| | 8 | Zener Diode |
| 3rd Week | 9 | Zener Diode |
| | 10 | PIN Diode, Tunnel Diode |
| | | **Rectifier Circuit & Filters:** Classification of rectifiers |
| | 11 | Classification of rectifiers, Analysis of half wave, full wave centre tapped and Bridge rectifiers |
| | 12 | Analysis of half wave rectifiers and calculate dc output current and voltage, RMS output current and voltage, Rectifier efficiency |
| 4th Week | 13 | Analysis of half wave rectifiers and calculate Ripple factor, Regulation, Transformer utilization factor, Peak inverse voltage |
| | 14 | Full wave centre tapped and Bridge rectifiers and calculate: DC output current and voltage, RMS output current and voltage, Rectifier efficiency |
| | 15 | Full wave centre tapped and Bridge rectifiers and calculate: Ripple factor, Regulation, Transformer utilization factor, Peak inverse voltage |
| | 16 | Filters: Shunt capacitor filter, Choke input filter, π filter |
| | 17 | **Transistors:** Principle of Bipolar junction transistor, Different modes of operation of transistor Current components in a transistor, |
| | 18 | Principle of Bipolar junction transistor, Different modes of operation of transistor |

| | | |
|---|---|---|
| 5th Week | | Current components in a transistor, |
| | 19 | Transistor as an amplifier |
| | 20 | Transistor circuit configuration & its characteristics, CBC on figuration, CEC on figuration, CCC on figuration |
| 6th Week | 21 | Transistor circuit configuration & its characteristics, CBC on figuration, CEC on figuration, CCC on figuration |
| | 22 | **Transistor circuits:** Transistor biasing, Stabilization, Stability factor |
| | 23 | Transistor biasing, Stabilization, Stability factor |
| | 24 | Different method of Transistors Biasing, Base resistor method, Collector to base bias |
| 7th Week | 25 | Different method of Transistors Biasing, Base resistor method, Collector to base bias |
| | 26 | Self-bias or voltage divider method |
| | 27 | **Transistor Amplifier & Oscillators:** Practical circuit of transistor amplifier DC load line and DC equivalent circuit, AC load line and AC equivalent circuit |
| | 28 | Practical circuit of transistor amplifier DC load line and DC equivalent circuit, AC load line and AC equivalent circuit |
| 8th Week | 29 | Calculation of gain, Phase reversal |
| | 30 | H-parameters of transistors, Simplified H- parameters of transistors |
| | 31 | Generalized approximate model, Analysis of CB amplifier |
| | 32 | Generalized approximate model, Analysis of CE, amplifier using generalized approximate model |
| 9th Week | 33 | Generalized approximate model, Analysis of CC, amplifier using generalized approximate model Multistage transistor amplifier, R.C. coupled amplifier, Transformer coupled amplifier |
| | 34 | Feedback in amplifier, General theory of feedback |
| | 35 | Negative feedback circuit, Advantage of negative feedback |
| | 36 | Power amplifier and its classification Difference between voltage amplifier and power amplifier |
| 10th Week | 37 | Transformer coupled class A power amplifier |
| | 38 | Class A push–pull amplifier, Class B push–pull amplifier |
| | 39 | Oscillators, Types of oscillators, Essentials of transistor oscillator Principle of operation of tuned collector, |
| | 40 | Hartley, colpitt, |
| 11th Week | 41 | Phase shift, Wein-bridge oscillator (no mathematical derivations) |
| | 42 | **Field Effect Transistor:** Classification of FET**,** Advantages of FET over BJT, Principle of operation of BJT |
| | 43 | Classification of FET, Classification of BJT |
| | 44 | FET parameters (no mathematical derivation), DC drain resistance, AC drain resistance, Trans-conductance |
| | 45 | Biasing of FET |

| | | |
|---|---|---|
| 12th Week | 46 | Biasing of FET |
| | 47 | **Operational amplifier:** General circuit simple of OP-AMP and IC–CA–741OPAMP, Operational amplifier stages |
| | 48 | Equivalent circuit of operational amplifier<br>Open-loop OP-AMP configuration |
| 13th Week | 49 | OPAMP with feedback, Inverting OP-AMP |
| | 50 | Non inverting OP-AMP |
| | 51 | Voltage follower & buffer, |
| | 52 | Differential amplifier |
| 14th Week | 53 | Adder or summing amplifier |
| | 54 | Subtractor, Integrator, |
| | 55 | Differentiator, Comparator |
| | 56 | Revision |
| 15th Week | 57 | Revision |
| | 58 | QUESTION AND ANSWER DISCUSSION |
| | 59 | QUESTION AND ANSWER DISCUSSION |
| | 60 | QUESTION AND ANSWER DISCUSSION |


| Sl. No | Name of Authors | Title of the Book | Name of the publisher |
|---|---|---|---|
| 1 | Sanjeev Gupta | Electronic Devices and Circuits | Dhanpat Rai Publications |
| 2 | R.S Sedha | Electronics Circuit | S. CHAND |