Subject: Analog Integrated Circuit
Code: PC-EI303
Contacts: 3L
Credit-3
Total lectures: 45

Course Content:

Module-I

Brief overview of semiconductor and junction diode. Introduction to BJT and FET (JFET & MOSFET). **[L-4]**

Transistor Biasing Circuits: Different types of biasing circuits for BJT and FET, stability factors, bias compensation, dc & ac load line analysis and thermal runaway. **[L-6]**

Module-II

Small Signal Analysis of BJT: Transistor hybrid model, derivation of voltage gain, current gain, input impedance and output impedance, trans-conductance, low frequency small signal analysis of CE, CB and CC type RC coupled amplifier using hybrid-π and T model, determination of voltage gain, current gain, input impedance and output impedance, analysis of high frequency model. Frequency response of a RC coupled amplifier. **[L-8]**

Module-III

Feedback and Oscillator Circuits: Feedback concept, Feedback topologies, classification of amplifiers, Bark-hausen criteria, Oscillators- Wien bridge oscillator, Phase shift oscillator and Crystal oscillator. [**L-5]**

Module-IV

Operational Amplifier (OPAMP): Ideal OPAMP, Equivalent circuit, characteristics, Inverting and non-inverting configuration (ideal & Practical), summer, unity gain buffer, Differential amplifier, CMRR. **[L-6]**

Module-V

OPAMP Applications: Instrumentation amplifier and its application, comparator (zero crossing & Schmitt trigger), V-I and I-V converter, log and anti-log amplifier, precision rectifier (half & full wave), integrator and differentiator (ideal & Practical), IC 555 timer in monostable and astable mode. **[L-10]**

Module-VI

Introduction to multi-vibrator, IC555,NE565/NE566.
Linear Voltage Regulator: Series and Shunt, IC based, power supply design. [**L-6]**

Text Books:

1. D. Roy Choudhury&Shail B. Jain, Linear Integrated Circuits, New Age International Publishers Ltd., New Delhi.
2. Adel S. Sedra& Kenneth C. Smith, Microelectronic Circuits, Oxford University Press, New Delhi.
3. Jacob Millman& Christos C. Halkias, Integrated Electronics, McGraw Hill.

ReferenceBooks:

1. Ramakant A. Gayakwad, Op-Amps and Linear Integrated Circuits, PHI Learning,New Delhi.

2. Sergio Franco, Design with Operational Amplifiers and Analog Integrated Circuits, 3rd Edition, McGraw Hill.

3. Robert L. Boylestad&LouisNashelsky, Electronic Devices and Circuit Theory, Pearson/PHI, New Delhi.

4. Theodore F. Bogart, Jeffrey S. Beasley, &Guillermo Rico, Electronic Devices and Circuits, Pearson/PHI, New Delhi.