**ANALOG ELECTRONIC CIRCUITS**

**Contact: 3L Credit: 3**

**Module-1: [10]**

1. Filters and Regulators: Capacitor filter, π-section filter, ripple factor, series and shunt voltage regulator, percentage regulation, 78xx and 79xx series, concept of SMPS. [4]

2. Transistor Biasing and Stability: Q-point, Self Bias-CE, Compensation techniques, h-model of transistors. Expression for voltage gain, current gain, input and output impedance, trans-resistance & trans-conductance; Emitter follower circuits, High frequency model of transistors. [6]

**Module -2: [10]**

1. Transistor Amplifiers: RC coupled amplifier, functions of all components, equivalent circuit, derivation of voltage gain, current gain, input impedance and output impedance, frequency response characteristics, lower and upper half frequencies, bandwidth, and concept of wide band amplifier. [6]

2. Feedback Amplifiers & Oscillators: Feedback concept, negative & positive feedback, voltage/ current, series/shunt feedback, Berkhausen criterion, Colpitts, Hartley’s, Phase shift, Wein bridge and crystal oscillators. [ 4]

**Module -3: [10]**

1. Operational Amplifier: Ideal OPAMP, Differential Amplifier, Constant current source (current mirror etc.), level shifter, CMRR, Open & Closed loop circuits, importance of feedback loop (positive & negative), inverting & noninverting amplifiers, voltage follower/buffer circuit. [6]

2. Applications of Operational Amplifiers: adder, integrator & differentiator, comparator, Schmitt

Trigger. Instrumentation Amplifier, Log & Anti-log amplifiers, Trans-conductance multiplier, Precision Rectifier, voltage to current and current to voltage converter, free running oscillator. [6]

**Module -4: [8]**

Multivibrator – Monostable, Bistable, Astable multivibrators; Monostable and astable operation using 555 timer. [2]

**Text Books:**1.Microelectronic Circuits, Sedra & Smith, Oxford University Press.

2.Integrated Electronics, Milman & Halkias, Mc Graw Hill Company.

3.Electronic devices & Circuits, Balbir Kumar & Shail B. Jain, PHI.

4.Op-amps and Linear IC’s, R.A. Gayakwad, PHI.

**Reference Books:** 1.Microelectronic Circuit- Analysis & Design, Rashid, Cenage Learning.

2.Electronic Circuits: Discrete & Integrated, 3rd Edition, Schilling & Belove, Mc Graw Hill Company.

3. Electronic principles, 6th Edition, Malvino, Mc Graw Hill Company.

4.Operational Amplifier & Linear IC’s, Bell, Oxford University Press.

5.2000 Solved Problems in Electronics, Jimmie J. Cathey, Mc Graw Hill Inc.

6.Electronic Devices -System & Application, Robert Diffenderfer, Cengage Learning.

7.Op- Amps & Linear Integrated Circuits, Ravi Raj Dudeja & Mohan Dudeja, Umesh Publication

**ANALOG ELECTRONIC CIRCUITS LABORATORY**

**Contact: 4L Credit: 2**

1.Study of Ripple and Regulation characteristics of full wave rectifier with and without capacitor filter.

2.Study of Zener diode as voltage regulator.

3.Construction of two stage R-C coupled amplifier & study of its gain and Bandwith.

4.Realisation V-I & I-V converter using Operational Amplifier.

5.Study of timer circuit using NE 555 and configuration of Monostable and Astable Multivibrator.

6.Study of DAC & ADC

7.Design of Combinational circuit for BCD to decimal conversion to drive 7-segment display using Multiplexer.

8. Study of Inverting and Non Inverting Aplifier using Op-Amp

9. Study of Voltage Adder Circuit using Op-Amp

10. Study of Voltage Subtractor Using Op Amp