

IAC - 110
Electronic Systems

(02 credits – 50 marks)

Course Outcomes:

On completion of the course, students should be able to-

1	Recognize OP-AMPs for building systems to develop application oriented platforms
2	Associate with controlled oscillations and monolithic frequency synthesizers
3	Experiment analog/digital timing and counting circuits
4	Classic treatments on Phase locked loops and frequency to voltage conversion
5	Interpret active filter operations
6	Identify necessary system requirements
7	Address and resolve complex application challenges

Course Contents:

Module– I: Special Operational Amplifiers and Non-linear Function Circuits (06 Hrs)

High voltage/high current amplifiers, chopper and chopper stabilized amplifiers, instrumentation amplifier and isolation amplifier.

Nonlinear function circuits: limiter, log/anti-log, multiplier/divider, peak detector, comparator, true RMS/DC converter, square wave oscillators.

Module– II: Oscillators, Timers, Counters (06 Hrs)

Sinusoidal and relaxation oscillators: phase shift oscillator, Ring oscillator, Wien-bridge oscillator, quadrature oscillator, crystal oscillator and clock circuits, voltage controlled oscillators – sine, square and triangle, frequency synthesizers.

Timing and counting circuits :digital counters, shift register, analog and digital timers, frequency counters, PLA and PLD applications.

Module– III: Phase Locked Loops and F/V conversion (06 Hrs)

Phase locked loop, Loop response, Applications of PLL.

Frequency-to-voltage converters: diode pump integrator, frequency and RPM transducers; Phase and phase/frequency comparators – analog and digital.

Module- IV: Active Filters

(06 Hrs)

Active filter types, Filter approximations – Butterworth and chebyshev, filter realizations, frequency and impedance, scalings, filter transformations, sensitivity, switched capacitor circuit.

Module- V:

Presentations, case studies, Assignments, Tutorials based on Module I to IV.

Ref. Books:

1. Sende, B.S. – Introduction to System design using Integrated Circuits, New Age International (P), NewDelhi.
2. Fitchen, F.C. – Integrated Circuits and Systems, Van Nostrand, New York.