

LINEAR IC APPLICATIONS

Course Code: 13EC1110

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Pre requisites:

Electronic Circuits, Basic Network Analysis, Pulse and Digital Circuits

Course Educational Objectives:

- ❖ To introduce the basic building blocks of linear integrated circuits.
- ❖ To teach the linear and non-linear applications of operational amplifiers.
- ❖ To introduce the concepts of waveform generation and introduce some special function ICs.

Course Outcomes:

- ❖ Build different Electronic circuits.
- ❖ Linear IC applications help in IC based Electronic projects design.

UNIT-I

(12 Lectures)

OPERATIONAL AMPLIFIERS:

Differential Amplifier- DC and AC analysis. Integrated circuits-Types, Classification of IC, Package Types and temperature ranges. Op-Amp Block Diagram, Characteristics of OP-Amps, ideal and practical Op-Amp specifications. DC and AC characteristics: 741 op-amp & its features, Op-Amp parameters & their measurements- Input & Output Offset voltages & currents, slew rate, CMRR, PSRR, Drift, Frequency Compensation techniques.

UNIT-II

(14 Lectures)

APPLICATIONS OF OP- AMPS:

Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, Voltage to current and

current to Voltage converters, Comparators, Schmitt Trigger, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers.

VOLTAGE REGULATORS:

IC723 voltage regulator, three terminal regulators (78XX and 79XX)

UNIT-III

(12 Lectures)

ACTIVE FILTERS AND OSCILLATORS:

Butter worth filters– 1st order LPF, HPF filters, Band pass, Band reject and All pass filters, Oscillators –RC and Wien bridge oscillators, VCO (566).

UNIT-IV

(14 Lectures)

TIMERS & PHASE LOCKED LOOPS:

Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, 555 timer as Schmitt Trigger. PLL - introduction, block schematic, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators.

UNIT-V

(8 Lectures)

D/A & A/D CONVERTERS:

Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, IC AD574 (12 bit ADC).

TEXT BOOKS:

1. Ramakanth A. Gayakwad, “*Op-Amps & Linear ICs*”, 4th Edition, PHI, 2002.
2. D. Roy Chowdhury, “*Linear Integrated Circuits*”, New Age International (p) Ltd, 2nd Edition, 2003.

REFERENCES:

1. Sergio Franco, “*Design with Operational Amplifiers & Analog Integrated Circuits*”, McGraw Hill, 1988.

2. R.F.Coughlin & Fredrick Driscoll, “*Operational Amplifiers & Linear Integrated Circuits*”, PHI, 5th Edition, 1998.
3. Millman, “*Micro Electronics*”, McGraw Hill, 1988.
4. C.G. Clayton, “*Operational Amplifiers*”, 5th Edition, Newnes Publishers, 2003.

