



III Year-I Semester	T	P	C
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LINEAR IC APPLICATIONS(RT31042)

PrerequisiteCourse:

Electronic circuit analysis

CourseDescriptionandObjectives:

- ❖ Study characteristics, realize circuits, design for signal analysis using Op-amp ICs.
- ❖ Study the linear and non-linear applications of operational amplifiers.
- ❖ Study IC 555 timer, PLL and VCO with their applications.
- ❖ Study and understand different types of ADCs and DACs
- ❖ Acquire skills required for designing and testing integrated circuits

CourseOutcomes:

Upon completion of the course, the student will be able to achieve the following outcomes.

Cos	CourseOutcomes	POs
1	Study characteristics, realize circuits, design for signal analysis using Op-amp	3
2	Study the linear and non-linear applications of operational amplifiers.	3
3	Study IC 555 timer, PLL and VCO with their applications.	2
4	Study and understand different types of ADCs and DACs	1
5	Acquire skills required for designing and testing integrated circuits	3

Syllabus:

UNIT I
INTEGRATED CIRCUITS : Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

UNIT II
Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input & Out put Off set voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT III
LINEAR AND NON-LINEAR APPLICATIONS OF OP-AMPS: Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers. Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

UNIT IV
ACTIVE FILTERS, ANALOG MULTIPLIERS AND MODULATORS: Introduction, Butter worth filters – 1st order, 2nd order LPF, HPF filters. Band pass, Band reject and All pass filters. Four Quadrant multiplier, balanced modulator, IC1496, Applications of analog switches and Multiplexers, Sample & Hold amplifiers.

UNIT V
TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators. Applications of VCO (566).

JAWAHARLAL NEHRUTECHNOLOGICALUNIVERSITY:KAKINADA

KAKINADA–533003,AndhraPradesh,India

R-13 Syllabus for ECEJNTUK

UNIT VI

DIGITAL TO ANALOG AND ANALOG TO DIGITAL 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 AD 574 (12 bit ADC).

TEXT BOOKS:

- Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.

REFERENCE BOOKS:

1. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.
2. OP AMPS and Linear Integrated Circuits concepts and Applications, James M Fiore, Cenage Learning India Ltd.
3. Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll, PHI, 6th Edition.
4. Operational Amplifiers – C.G. Clayton, Butterworth & Company Publ.Ltd./ Elsevier, 1971 .
5. Operational Amplifiers & Linear ICs – David A Bell, Oxford Uni. Press, 3rd Edition