B.Tech II Year II Semester

LINEAR IC APPLICATIONS

Course Code: 21EC404PC **L/T/P/C 3/0/0/3**

Course Objectives:

- To introduce the basic building blocks of linear integrated circuits and be able to understand the linear and non – linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.
- To teach the theory of ADC and DAC.
- To introduce the concepts of waveform generation and introduce some special function ICs.
- To understand and implement the working of basic digital circuits
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Course Outcomes:

- Understand the operational amplifiers with linear integrated circuits.
- Understanding of the different families of digital integrated circuits and their characteristics.
- Design circuits using operational amplifiers for various applications.
- Differentiate and apply the ADC and DAC concepts
- Apply Integrated circuits for applications related to signal processing, communication etc

UNIT– I

Block diagram of Operational Amplifier (Op-Amp), Op-Amp DC and AC Characteristics, Op-Amp open loop and closed configurations, Modes of Operation – Inverting, Non-Inverting, and Differential. Classification of Integrated Circuits, Features of IC 741 and LM 324.

UNIT– II

Op-Amp Applications- Waveform Generators, Instrumentation Amplifier, Sample and hold circuit, Differentiator, Integrator, Schmitt Trigger, Comparators, Active Filters and Oscillators.

UNIT– III

IC555 Timer – Functional Diagram, Monostable, and Astable Operations, Applications, Voltage Regulators, IC723 Regulator, Three Terminal Voltage Regulators IC 7805,7809 and 7912.

UNIT– IV

Basic DAC techniques, types of DACs-Weighted Resistor, R-2R ladder and Inverted R-2R DAC, ADCs – Flash type, ADC, Counter type ADC, Successive Approximation ADC and Dual Slope ADC.

UNIT– V

Digital ICs- IC74138 3-8 Decoder, IC74151 Multiplexer, IC74155 Demultiplexer, 4-bit Parallel Binary Adder/Subtractor, IC7485 Comparator. IC7474 Flip-flops, IC7490&IC74193 Counters, IC74194&195 Shift Registers.

TEXT BOOKS:

1. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 2003.
2. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.
3. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2ndEd., 2003.
4. Operational Amplifiers with Linear Integrated Circuits by K.Lal Kishore – Pearson, 2009.

REFERENCE BOOKS:

1. Operational Amplifiers & Linear Integrated Circuits, R.F. Coughlin & Fredrick F. Driscoll, PHI.
2. Operational Amplifiers & Linear Integrated Circuits: Theory & Applications, Denton J. Daibey, TMH
3. Design with Operational Amplifiers & Analog Integrated Circuits, Sergio Franco, McGraw Hill.
4. Digital Fundamentals - Floyd and Jain, Pearson Education.