Subject Code	Subject Name (Lab Oriented Theory Course)	Category	L	T	P	C
EE19441	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	PC	3	0	2	4

Objectives:

- To learn the IC fabrication procedure and the internal structure of an op-amp.
- To study the characteristics, design and implementation of basic op-amp applications.
- To explore on active filters, signal generators, ADC and DAC.
- To impart knowledge on design and implementation of IC 555 timer, VCO and PLL.
- To inculcate knowledge on design of power supply using regulator ICs.

UNIT-I	**OP-AMP FUNDAMENTALS AND CHARACTERISTICS**	**9**

Fundamentals of monolithic IC technology and fabrication – Internal structure of op-amp – Ideal op-amp characteristics – DC characteristics, AC characteristics – closed loop operation of op-amp.

UNIT-II	**BASIC APPLICATIONS OF OP-AMP**	**9**

Inverting and Non-inverting Amplifiers – Voltage follower – Summing amplifier – Difference amplifier –V/I and I/V converter – Differentiator – Integrator – Instrumentation amplifier–log and antilog amplifier–S/H circuit.

UNIT-III	**APPLICATIONS OF OP-AMP**	**9**

First order active filters – Comparators – Multivibrators – Triangular wave generators — Digital to Analog converter (R - 2R ladder and weighted resistor types) – Analog to Digital converters (Successive approximation and Flash type).

UNIT-IV	**SPECIAL ICs**	**9**

Functional block, characteristics and application circuits with 555 Timer IC – IC566 Voltage Controlled Oscillator (VCO) – IC 565 Phase Locked Loop (PLL) – Applications of PLL (frequency multiplier and frequency divider) – Analog multiplier ICs.

UNIT-V	**REGULATOR ICs**	**9**

IC voltage regulators – LM78XX, 79XX – Fixed voltage regulators – LM317, 723 Variable voltage regulators, switching regulator – SMPS – ICL 8038 function generator IC.

Contact Hours	**:**	**45**

List of Experiments

1	Application of Op-Amp I : inverting amplifier and non-inverting amplifier
2	Application of Op-Amp II : Adder and subtractor
3	Application of Op-Amp III : comparator and Zero crossing detector
4	Application of Op-Amp IV : Triangular wave generators
5	Application of Op-Amp V : Integrator
6	Application of Op-Amp VI : Differentiator
7	Timer IC applications: Monostable operation and Astable operation.
8	Fixed and variable voltage regulators
9	Switched Mode Power Supply design using analog ICs
10	Study of VCO and PLL.

Contact Hours	**:**	**30**
Total Contact Hours	**:**	**75**

Course Outcomes: On completion of course, students will be able to

- obtain the characteristics of op-amp.
- realize the various mathematical applications of op-amp.
- design the active filters using op-amp.
- generate a PWM pulses.
- develop power supply circuits.

Text Book (s):

1. D. Roy Choudhary, Sheilb.Jani, "Linear Integrated Circuits", fifth edition, New Age, 2018.
2. Ramakant A.Gayakwad, "Op-amps and Linear Integrated Circuits", fourth edition, Pearson Education, 2015.
3. David. A. Bell, "Op-amp & Linear ICs", Oxford, 3rd edition, 2011.

Reference Books(s) / Web links:

1. Fiore, "Op Amps & Linear Integrated Circuits Concepts & Applications", Cengage publications, 2010.
2. Floyd, Buchla, "Fundamentals of Analog Circuits", Pearson, 2001.
3. Jacob Millman, Christos C.Halkias, "Integrated Electronics – Analog and Digital circuits system", Tata McGraw Hill, 2003.
4. Robert F.Coughlin, Fredrick F. Driscoll, "Op-amp and Linear ICs", PHI Learning, 6th edition, 2012.