ANALOG CIRCUITS

Course Code	19EE3403	**Year**	II	**Semester**	II
Course Category	Program Core	**Branch**	EEE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Design and analyze feedback amplifiers.
CO2	Design and analyze Power amplifier and oscillator Circuits.
CO3	Realize linear and non-linear circuits using op-amp
CO4	Design and Understand various timing and filter circuits using 555 IC
CO5	Compare the performance of various types of ADC and DAC Circuits

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Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	3							2	3	2
CO2	3	3	2	2	3							2	3	2
CO3	3	3	2	2	3							2	3	2
CO4	3	3	2	2	3							2	3	2
CO5	3	3	2	2	3							2	3	2

Syllabus		
Unit No.	Contents	Mapped CO
I	**Feedback Amplifiers:** The general feedback structure, properties of negative feedback, basic feedback topologies, the series-shunt feedback amplifier, the series-series feedback amplifier, shunt-shunt and shunt-series feedback amplifiers, determining loop gain.	CO1
II	**Oscillators:** Basic principles of sinusoidal oscillators, op amp RC oscillator circuits, LC and crystal oscillators. Power amplifiers: Classification of output stages, class A output stage, class B output stage, class AB output stage, Power Transistors.	CO2
III	**Operational Amplifiers:** The ideal op amp, the inverting and non-inverting configuration, difference and instrumentation amplifiers, summing, scaling and averaging amplifiers, integrators, differentiators, logarithmic amplifiers, V/I and I/V converters, Comparators and waveform generators.	CO3
IV	**IC Timers:** Introduction, operating modes of the 555 timer, terminals of the 555 timer, free running mode and applications. Active Filter Design: LPF,	CO4

	HPF, BPF, BEF, all-pass filters. Voltage reference circuits: Power supplies: ripple removal and regulation.	
V	**Data Converters:** Digital to analog conversion process, voltage output DACs, multiplying DAC, DAC characteristics. Analog to Digital Converters: integrating ADC, successive approximation ADC, Flash converters: Principle of operation, Dual slope ADC, Remote control applications, ADC characteristics.	CO5

Learning Resources

Text Books

1. Adel S. Sedra, Kenneth C. Smith, Arun N. Chandorkar, Microelectronic Circuits, 6/e, Oxford University Press, 2013.
2. D Choudhury Roy, Shail B. Jain, Linear Integrated Circuits, New Age International, 2003
3. Ramakanth Gayakward, Op-Amps and Linear Integrated Circuits, 4/e, Pearson Education, 2007

Reference Books

1. Behzad Razavi, Fundamentals of Microelectronics, 2/e, Wiley Student Edition, 2013.
2. R.F Coughlin, F.F Driscoll, Op-Amps and Linear Integrated Circuits, 6/e, Pearson Education, 2008.
3. Sergio Franco, Design with Operational Amplifiers and Analog Integrated Circuits, 3/e, Tata Mc-Graw Hill, 2002.
