ANALOG CIRCUITS

Course Code	20EC3401	Year		II	Semester	II
Course Category	Program Core	Branch		ECE	Course Type	Theory
Credits	3	L-T-P		3-0-0	Prerequisites	EDAC
ContinuousInternal Evaluation	30	Semester End Evaluation		70	Total Marks	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Explain the basic concepts of various types of Analog Circuits(L2)
CO2	Apply the concepts of feedback to find the characteristics parameters of feedback amplifiers and oscillators(L3)
CO3	Apply the principles of circuit analysis techniques to solve the problems on Op-amps , Timers and data converters(L3)
CO4	Analyze various analog circuits to support generalizations (L4)

Contribution of Course Outcomes towards Achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1:Low)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2									1				2
CO2	3									2				3
CO3	3									2				3
CO4		3								3				3
Average* (Rounded to nearest integer)	3	3								2				3

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, CO2, CO4
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	CO1, CO2, CO4
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	CO1, CO3, CO4
IV	IC Timers: Introduction, operating modes of the 555 timer, terminals of the 555 timer, free running mode and applications. Active Filter Design: LPF, HPF, BPF, BEF, all-pass filters.	CO1, CO3, CO4

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.	CO1, CO3, CO4

Learning Resources

Text Books

1. Adel S. Sedra, Kenneth C. Smith, Arun N. Chandorkar, Microelectronic Circuits, 6/e, Oxford University Press, 2013.

2. D Roy Choudhury, Shail B. Jain, Linear Integrated Circuits, New Age International, 2003

3.Ramakanth A.Gayakwad, Op-Amps and Linear Integrated Circuits, 4/e, Pearson Education, 2007

Reference Books

1. BehzadRazavi, 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.

Web Resources:

1. https://nptel.ac.in/courses/108/108/108108114/

2. https://nptel.ac.in/courses/108/105/108105158/

3. https://www.digimat.in/nptel/courses/video/108108111/L19.html

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