

ANALOG CIRCUITS

Course Code	23ES1401	Year	II	Semester(s)	II
Course Category	Engineering Science	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	BEEE
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	Understand the various circuits of a transistors,clipping,clamping, OP-AMP applications and digital circuits.(L2)
CO2	Apply the diode clipping and clamping circuits and different circuits of transistors.(L3)
CO3	Apply the operation of different oscillator circuits, OP-AMP's, ADC, DAC, Timers and PLL and its applications. (L3)
CO4	Illustrate the different analog circuits ,digital circuits and their applications .(L4)
CO5	Capability to understand different types of analog and digital circuits and transform them into a report.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3												3	1
CO3	3				3								3	1
CO4		3			3								3	1
CO5									3	3			3	1

SYLLABUS		
Unit No.	Contents	Mapped CO
I	<p>Diode clipping and clamping circuits: Diode clippers, clipping at two independent levels, Transfer characteristics of clippers, clamping circuit operation.</p> <p>DC biasing of BJTs: Load lines, Operating Point, Bias Stability, Collector-to-Base Bias, Self-Bias, Bias Compensation, Thermal Runaway, Thermal Stability.</p>	CO1,CO2, CO4,CO5
II	<p>Small Signals Modeling of BJT: Analysis of a Transistor Amplifier Circuit using h-parameters, Simplified CE Hybrid Model, Frequency Response of CE and CC amplifiers.</p>	CO1,CO2, CO4,CO5

III	<p>Oscillator Circuits: Barkhausen Criterion of oscillation, Oscillator operation, RC phase shift oscillator, Wien bridge Oscillator, Crystal Oscillator.</p> <p>Operational Amplifiers: Introduction, Basic information of Op-Amp, Ideal Operational Amplifier, Block Diagram Representation of Typical Op-Amp, OP-Amp Characteristics: Introduction, DC and AC characteristics, 741 op-amp & its features.</p>	CO1,CO3, CO4,CO5
IV	<p>OP-AMP Applications: Introduction, Basic Op-Amp Applications, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converter, Sample and Hold Circuit, Differentiator, integrator.</p> <p>Comparators and Waveform Generators: Introduction, Comparator, Square Wave Generator, Triangular Wave Generator, Sine Wave Generators.</p>	CO1,CO3, CO4,CO5
V	<p>Timers and Phase Locked Loop: Introduction to 555 timer, functional diagram, PLL block schematic, principles and description of individual blocks, 565 PLL, Applications of VCO (566).</p> <p>Digital to Analog And Analog to Digital Converters: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, A-D Converters – parallel Comparator type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.</p>	CO1,CO3, CO4,CO5

Learning Resources

Text Books

1. J. Millman, C.Halkias ,”Electronic Devices and Circuits”, Tata Mc-Graw Hill, 2nd Edition, 2010.
2. D. Roy Choudhury,” Linear Integrated Circuits”, New Age International (p) Ltd, 2nd Edition, 2003.

Reference Books

1. Robert L. Boylestad and Lowis Nashelsky,” Electronic Devices and Circuit Theory”, Pearson Edition, 2021.
2. G.K. Mithal,”Electronic Devices and Circuits”,Khanna Publisher, 23rd Edition, 2017.
3. David Bell, “Electronic Devices and Circuits”, Oxford, 5thEdition, 2008.
4. Malvino, Albert Paul, and David J. Bates,” Electronic Principles”, McGraw-Hill/Higher Education, 2007.
5. Gayakwad R.A,” Electronic Principles”, Prentice Hall India, 2002.
6. Sanjay Sharma, “Operational Amplifiers and Linear Integrated Circuits “,Kataria& Sons, 2ndEdition, 2010.

Online Learning Resources:

1. <https://nptel.ac.in/courses/122106025>.
2. <https://nptel.ac.in/courses/108102112>.