



# C.U.SHAH UNIVERSITY

**FACULTY OF:** - Technology & Engineering  
**DEPARTMENT OF:** -Instrumentation & Control Engineering  
**SEMESTER:** - III  
**COURSE:-** B.Tech  
**CODE:** - 4TE03AEC1  
**NAME –** Analog Electronics Circuits

## Teaching & Evaluation Scheme

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE03AEC1	Analog Electronics Circuits	4	0	2	6	5	30	1.5	70	3	30	20	---	150

### Objectives

- To study various analog electronics circuits namely power supplies, amplifiers and oscillators.
- To study design and implementation of analog circuits using analog components.

### Prerequisites

- Basics of Electronics Circuits and Components

### Course Outlines

Sr. No.	Course Contents	Hours
1	<b>Power Supplies</b> Review of diode rectifier circuits and filters, need for regulation, break down diode regulators, series regulators, Short circuit protection, three pin I.C. regulators, switch mode power supply.	10
2	<b>Amplifiers-I</b> Biasing of BJT & FET, Low frequency parameters and equivalent circuits, Analysis of single stage BJT & FET amplifier configuration using Hybrid models, input & output impedance, voltage & current gain calculations, bootstrapping analysis of paired configurations (e.g. Darlington, difference amplifier etc.)High frequency model of BJT and FET, Hybrid $\pi$ C.E. Model CE short circuit gain, concept of $f_B$ , $f_T$ , Interstage coupling, gain and bandwidth of a cascade amplifier, frequency response, effect of bypass and coupling capacitors on frequency response, classification and distortion of amplifiers, fundamentals of tuned amplifier	14

3	<b>Amplifiers-II</b> Power Amplifier, transformer coupling, power calculation of class A & B type, class AB operation, push pull & complementary configurations, Heat sinks design & calculation. Concept of feedback, voltage current transresistance and transconductance types, general characteristics of negative feedback amplifiers, topologies, Analysis and calculation of voltage and current gains, input and output impedance of feedback amplifiers.	12
4	<b>Oscillators</b> Criterion of Oscillation, General condition of Oscillation analysis & working of sinusoidal oscillators such as R. C. phase shift, weinbridge, Hartley, Colpitts, Crystal etc. and Non-sinusoidal oscillators such as multi-vibrators, UJT saw tooth generators, Blocking Oscillators.	10
5	<b>Operational Amplifier Basics</b> Ideal characteristics, I.C. version, specification, offset error voltages, and Currents, measurement of parameters, Analysis of basic inverting and non-inverting amplifiers, universal balancing technique Frequency Compensation.	06

### Learning Outcomes

- The students would be able to design and implement various Analog Circuits like power supplies, amplifiers and oscillators. These circuits are the fundamental circuits in any electronics devices. It also provides foundation to understand advance electronics circuits.

### Books Recommended

1. Integrated Electronics by Millman & Halkias - TATA MCGRAW-HILL
2. Electronics Device & Circuits by David A. Bell - OXFORD UNIVERSITY PRESS
3. Microelectronic Circuits by Sedra / Smith - OXFORD UNIVERSITY PRESS
4. Electronic Circuits by Schilling & Belove - MCGRAW-HILL INC
5. Electronic Devices & Cicuits by Mottershed - PHI LEARNING PVT LTD