C.U.SHAH UNIVERSITY

FACULTY OF: - Technology & Engineering
DEPARTMENT OF: -Electrical Engineering
BRANCH: Electrical Engineering
SEMESTER: - IV
COURSE:- B.Tech
CODE: - 4TE04ICA1
NAME – Integrated Circuits & Applications

Teaching & Evaluation Scheme

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme						
							Theory				Practical (Marks)		
		Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	Total
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE04ICA1	Integrated Circuits & Applications	4	0	2	6	5	30	1.5	70	3	30	20	---	150

Objectives
- To study various basic operation of Operational Amplifier.
- To study design and implementation of various operational circuits by using Op-Amps.
- To study and design active analog filters.
- To study and design nonlinear applications of Op-Amps

Prerequisites
- Basics of Electronics Circuits, Analog Circuits and Components

Course Outlines

Sr. No.	Course Contents	No Of Hours
1	**Integrated Circuits Fundamentals**: Classification of IC's based on scale of integration. Manufacturing techniques and applications i.e. analog or digital. Fabrication techniques, advantages over discrete components.	08
2	**Basic Operational Amplifier:** Various configurations and analysis of differential amplifier. Constant current source, current mirror circuits. IC operational amplifier and its characteristics, Specifications, parameters. Frequency response of Operational amplifier likes 741, 308, 356 etc. Applications of Operational amplifier such as DC/AC amplifier, voltage to current and current to voltage converter, Differentiator, Integrator, Bridge amplifier, Instrumentation amplifier, analog simulation for solution of differential equation. Voltage Regulators.	10

3	**Signal Generators Using IC:** Phase shift oscillator, Wein bridge oscillator. Multivibrators. Schmitt trigger circuit. Timer using IC 555.	06
4	**Non-Linear Applications:** Precision rectifier. Comparator. Zero crossing detector. V/F & F/V converter. Clipper/Clamper. Sample and Hold circuit. Window Comparator.	08
5	**Active Filters:** Introduction. Comparison & design of Butterworth & chebychev filters of various orders.	10
6	**Phase Locked Loop:** Introduction to PLL. Study of IC 565. Lock & capture range. Applications of PLL.	06
7	**Digital ICs:** TTL series, low power schottky devices. TTL parameters. CMOS series. Advantages & Types, Parameters, Characteristics. TTL to CMOS Interfacing & vice versa.	04

Learning Outcomes

- Students should be able to design operational circuits and operational circuits using Op-Amps.

Books Recommended

1. Op-Amp & Linear Integrated Circuits by Ramakant Gayakwad,PHI Publication.
2. Integrated Circuits by K. R. Botkar, Oxford Press
3. Digital Principles & Applications by Malvino & Leach, Tata MacGrawhill