INTEGRATED CIRCUITS APPLICATIONS LABORATORY

V Semester: EEE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AEC106	Core	-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36				Total Classes: 36		

I. COURSE OVERVIEW:

Linear and digital IC applications lab enables to learn design, testing and describing of circuit perfor- mance with digital and analog integrated circuits. It focuses on applications of special ICs and applythe techniques for the design of 741 ICs, applications of 555 timers, data converters and digital IC's for combination and sequential circuits design. This course provides practical hands-on experimentsto analyze characteristics of commercially available digital integrated circuits.

II. OBJECTIVES:

The course should enable the students to:

I	The experiments on design of Linear and Digital Integrated circuits using operational amplifier and digital ICs.
II	The design and implementation of analog circuits and gain the hands-onexperience on the various building blocks of digital circuits.
III	The IC based real-time applications in the fields of communication systems and home-based automation systems.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Design** linear Integrated circuits to perform mathematical operations and voltage gain calculations using IC741.	Create
CO 2	**Plot** the frequency response of second order active filters usingIC 741	Apply
CO 3	**Determine** the frequency of oscillations of multi-vibratorsusing IC741 and IC555 timer.	Apply
CO 4	**Obtain** the capture range and lock-in range of phase locked loop circuit using IC565.	Apply
CO 5	**Construct** the low and high voltage regulators to find thepercentage of regulation using IC723.	Apply
CO 6	**Implement** combinational and sequential circuits using digitalICs to verify their functionality.	Apply

IV. SYLLABUS:

LIST OF EXPERIMENTS

Week-l	**INVERTING, NON-INVERTING AND DIFFERENTIAL AMPLIFIERS**
To construct and test the performance of an Inverting, Non-inverting amplifier and Differential amplifier using IC 741	
Week-2	**INTEGRATOR AND DIFFERENTIATOR**
To construct and test the performance of an Integrator and Differentiator using IC 741	
Week-3	**SECOND ORDER ACTIVE LOWPASS, HIGHPASS AND BANDPASS FILTERS**

To design and verify the operation of the Active low pass, High pass and Band pass filters using IC 741	
Week-4	**ASTABLE MULTIVIBRATORS AND SCHMITT TRIGGER USING 555**
To design and construct an Astable multivibrators and Schmitt trigger using IC 555	
Week-5	**MONOSTABLE MULTIVIBRATORS 555**
To design and construct Monostable multivibrators using IC 555	
Week-6	**SCHMITT TRIGGER USING 555**
To design and construct schimitt trigger using NE555 Timer.	
Week-7	**PLL USING IC 565**
Verifying characteristics of PLL	
Week-8	**INSTRUMENTATION AMPLIFIER.**
To design and verify the operation of instrumentation amplifier using IC 741	
Week-9	**MULTIPLEXER AND DEMULTIPLEXER**
Verify Functionality of multiplexer and demultiplexer	
Week-l0	**ENCODER AND DECODER**
Verify Functionality of encoder and decoder	
Week-l1	**REALISATION OF DIFFERENT FLIP-FLOPS USING LOGIC GATES**
Verify Functionality of flip-flop	
Week-l2	**4 BIT COUNTERS**
Verify Functionality of counters	
Week-l3	**REALISATION OF SHIFT REGISTERS**
Verify Functionality of shit register	
Week-l4	**DECADE COUNTER**
Verify Functionality of decade counter	

Reference Books:

1. D. Roy Chowdhury, "Linear Integrated Circuits", New Age International (p) Ltd, 2nd Edition, 2003.
2. Ramakanth A. Gayakwad, "Op-Amps & linear ICs", PHI, 3rd Edition, 2003.
3. John F. Wakerly, "Digital Design Principles and Practices", Prentice Hall, 3rd Edition, 2005.

Web References:

1. http://www.ee.iitkgp.ac.in
2. http://www.citchennai.edu.in

Course Home Page:

LIST OF EQUIPMENT REQUIRED FOR A BATCH OF 36 STUDENTS		
S. No	**Name of the Equipment**	**Range**
1	Regulated Power Supply	0-30V DC
2	CRO	0-20 MHz
3	Function generator	20 MHZ
4	Digital IC Trainer Kit	--
5	Resistors	47Ω, 82 Ω, 100 Ω, 150 Ω, 220 Ω, 470 Ω, 560 Ω, 1k Ω, 2.2k Ω, 3.3k Ω.5k Ω,10k
6	Inductors	0.01mH, 0.1mH,10mH, 50mH
7	Capacitors	0.01µF, 0.1µF, 0.47µF, 470µF,
8	Decade counter	IC 7490
9	Op-amp	741 IC
10	TIMER IC	555 IC
11	IC'S	IC 7432 ,IC 7404,IC 7411,IC 7408,IC 7402,IC 7400 IC 7410,IC 7474,NE 65