INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad – 500043

Electronics and Communication Engineering

List of Laboratory Experiments

ANALOG AND PULSE CIRCUITS LABORATORY								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
AECC13	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	0	3	1.5	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 36**				**Total Classes:36**		
Branch: ECE	**Semester: IV**	**Academic Year: 2021-22**				**Regulation: UG20**		

Course overview:

The objective of this course is to meet the requirements of practical work meant for circuit designing, analysis and provides hands-on experience by examining the pulse circuits and measuring instruments. This lab covers the analysis of the linear, non-linear wave shaping circuits, oscillators and multivibrators. Students will proficiency with the capability to use simulation tools for performing analysis of various amplifier circuits, wave shaping circuits and multivibrator applications.

Course objectives:

The students will try to learn:

I. The basic amplifier circuits using common emitter and common base configurations.
II. The multivibrator circuits using transistors for real time applications.
III. The principle of oscillation and design of oscillators.
IV. The response of linear and non linear wave shaping circuits for sinusoidal, pulse and ramp inputs.

Course outcomes:

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

CO1: Build linear and non-linear wave shaping circuits to obtain the response for sine and square wave inputs.
CO2: Analyze the single stage and multistage Bipolar Junction Transistor (BJT) amplifiers for determining the voltage gain and bandwidth.
CO3: Make use of voltage series and current shunt feedback amplifier circuits for determining amplifier characteristics.
CO4: Apply the barkhausen criteria to oscillators for generating sine wave.
CO5: Identify the suitable multivibrator to generate non-sinusoidal waveforms for real time applications.
CO6: Examine the frequency response of class-A power amplifiers and single tuned voltage amplifier circuits using Bipolar Junction Transistor (BJT).

WEEK NO	EXPERIMENT NAME	CO
WEEK – I	**BASIC AMPLIFIERS / LINEAR WAVESHAPING** a. Simulate frequency response of common emitter amplifier and common base amplifier. b. Design RC low pass and high pass circuit for different time constants.	CO1, CO2
WEEK – II	**BASIC AMPLIFIERS/ LINEAR WAVESHAPING** a. Design RC low pass and high pass circuit for different time constants b. Simulate frequency response of common emitter amplifier and common base amplifier.	CO1, CO2
WEEK – III	**TWO STAGE RC COUPLED AMPLIFIER/ NON-LINEAR WAVESHAPING** a. Simulate frequency response of two stage RC coupled amplifier. b. Design transfer characteristics of clippers and clampers	CO1, CO2
WEEK – IV	**TWO STAGE RC COUPLED AMPLIFIER/ NON-LINEAR WAVESHAPING** a. Design transfer characteristics of clippers and clampers. b. Simulate frequency response of two stage RC coupled amplifier.	CO1, CO2
WEEK – V	**SINGLE TUNED AMPLIFIERS/ TRANSISTOR AS A SWITCH**	CO5, CO6

	a. Simulate a single tuned amplifier. b. Design of transistor as a switch. styles	
WEEK – VI	**SINGLE TUNED AMPLIFIERS/ TRANSISTOR AS A SWITCH** a. Design of transistor as a switch. b. Simulate a single tuned amplifier.	**CO5, CO6**
WEEK – VII	**FEEDBACK AMPLIFIERS/ COMPARATOR** a. Simulate voltage series feedback amplifier and current shunt feedback amplifier. b. Design of comparator circuit.	**CO3, CO5**
WEEK –VIII	**FEEDBACK AMPLIFIERS/ COMPARATOR** a. Design of comparator circuit. b. Simulate voltage series feedback amplifier and current shunt feedback amplifier	**CO3, CO5**
WEEK - IX	**RC PHASE SHIFT OSCILLATOR USING TRANSISTOR/ MULTIVIBRATORS** a. Simulate sine wave generated for a particular frequency by an RC phase shift oscillator. b. Design different types of multivibrators and plot its waveforms	**CO4, CO5**
WEEK - X	**RC PHASE SHIFT OSCILLATOR USING TRANSISTOR/ MULTIVIBRATORS** a. Design different types of multivibrators and plot its waveforms b. Simulate sine wave generated for a particular frequency by an RC phase shift oscillator.	**CO4, CO5**
WEEK - XI	**OSCILLATORS/ SCHMIT TRIGGER** a. Simulate sine wave generated for a particular frequency by Colpitts and Hartley oscillator. b. Design a Schmitt trigger circuit.	**CO4, CO5**
WEEK - XII	**OSCILLATORS/ SCHMIT TRIGGER** a. Design a Schmitt trigger circuit. b. Simulate sine wave generated for a particular frequency by Colpitts and Hartley oscillator	**CO4, CO5**
WEEK - XIII	**POWER AMPLIFIERS/ UJT AS A RELAXATION OSCILLATOR** a. Simulate class A power amplifier (transformer less) and class B power amplifier. b. Design of UJT as a relaxation oscillator	**CO4, CO6**
WEEK - XIV	**POWER AMPLIFIERS/ UJT AS A RELAXATION OSCILLATOR** a. Design of UJT as a relaxation oscillator. b. Simulate class A power amplifier (transformer less) and class B power amplifier.	**CO4, CO6**