ELECTRONIC CIRCUITS AND PULSE CIRCUITS LABORATORY

IV Semester: ECE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AEC102	Core	-	-	3	2	30	70	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

OBJECTIVES:

The course should enable the students to:

I. Be proficient in the use of linear and non linear wave shaping circuits for sinusoidal, pulse and ramp inputs.
II. Construct various multivibrators using transistors, and design sweep circuits and sampling gates.
III. Evaluate the methods to achieve frequency synchronization and division using uni-junction transistors, multivibrators and symmetric circuits.
IV. Design and analyze single stage and multi stage Amplifiers.
V. Interpret the concept of feedback and classify various types of feedback amplifiers.
VI. Understand the principle of oscillation and design different types of oscillators

COURSE LEARNING OUTCOMES (CLOs):

The students should enable to:

1. Understand the response of high pass RC and low pass RC circuits to different non sinusoidal inputs with different time constants and identify RC circuit's applications.
2. Understand the various clipper circuits using switching components like diodes, transistors and design various clipper circuits with and without reference voltages.
3. Formulate clamping circuit theorem and design practical clamping circuits by understanding the different diode clamper circuits.
4. Evaluate triggering points, hysteresis width of Schmitt trigger circuit and also design practical Schmitt trigger circuit.
5. Analyze the multivibrator circuits with applications and evaluate time, frequency parameters.
6. Analyze the unijunction transistor acts as relaxation oscillator.
7. Design various amplifier circuits using Bipolar Junction Transistors in Common Emitter, Common Base and Common Collector configurations.
8. Apply the usefulness of amplifiers using semiconductor devices in various real time circuit making.
9. Design various sinusoidal Oscillators like RC Phase shift, Hartley and Colpitts oscillator for various frequency ranges.
10. Analyze various types of feedback amplifiers like voltage series, current series, current shunt and voltage shunt.
11. Acquire experience in building and troubleshooting simple electronic analog circuits using Bipolar Junction Transistor.
12. Acquire the knowledge and develop capability to succeed national and international level competitive examinations

LIST OF EXPERIMENTS

Week-1	**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.
Calculate the frequency response of CE and CB amplifier. Calculate the different time constants of RC LPF and HPF.	
Week-2	**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.**
Calculate the frequency response of CE and CB amplifier. Calculate the different time constants of RC LPF and HPF.	
Week-3	**a.Simulate frequency response of two stage RC coupled amplifier.** **b.Design transfer characteristics of clippers and clampers**
Calculate the frequency response of two stage RC Coupled Amplifier. Verify the transfer characteristics of Clippers and Clampers.	
Week-4	**a.Simulate frequency response of two stage RC coupled amplifier.** **b.Design transfer characteristics of clippers and clampers**
Calculate the frequency response of two stage RC Coupled Amplifier. Verify the transfer characteristics of Clippers and Clampers.	
Week-5	**a. Simulate a single tuned amplifier.** **b. Design transistor as a switch.**
Calculate the frequency of Single tuned amplifier Calculate the switching times of a transistor.	
Week-6	**a. Simulate a single tuned amplifier.** **b. Design transistor as a switch.**
Calculate the frequency of Single tuned amplifier Calculate the switching times of a transistor.	
Week-7	**a. Simulate voltage series feedback amplifier and current shunt feedback amplifier.** **b. Design different types of multivibrators and plot its waveforms.**
Calculate the frequency response of feedback amplifiers Calculate the RC time constant and plot the waveform of a Multivibrators.	
Week-8	**a. Simulate voltage series feedback amplifier and current shunt feedback amplifier.** **b. Design different types of multivibrators and plot its waveforms.**
Calculate the frequency response of feedback amplifiers Calculate the RC time constant and plot the waveform of a Multivibrators.	
Week-9	**a. Simulate sine wave generated for a particular frequency by an RC phase shift oscillator.** **b. Design a Schmitt trigger circuit.**
Calculate the frequency of oscillations in RC phase shift oscillator Calculate the LTP ,UTP and plot the waveform of a Multivibrators.	
Week-10	**a. Simulate sine wave generated for a particular frequency by an RC phase shift oscillator.** **b. Design a Schmitt trigger circuit.**
Calculate the frequency of oscillations in RC phase shift oscillator Calculate the LTP ,UTP and plot the waveform of a Multivibrators.	
WeeK-11	**a. Simulate sine wave generated for a particular frequency by Colpitts and Hartley oscillator.** **b. Design a UJT Relaxation Oscillator.**
Calculate the frequency of oscillations in Colpitts and Hartley oscillator Calculate the negative resistance path of the UJT.	
Week-12	**a. Simulate sine wave generated for a particular frequency by Colpitts and Hartley oscillator.** **b. Design a UJT Relaxation Oscillator.**

Calculate the frequency of oscillations in Colpitts and Hartley oscillator Calculate the negative resistance path of the UJT.
Text Books:
1 Jacob Millman , Christor C Halkias, ―Integrated Electronics‖, Tata McGraw Hill, 1st Edition, 2008.. 2 David A.Bell,"Solid State Pulse Circuits",PHI learing,4th Edition
Reference Books:
1. David A. Bell ―Electronic Devices & Circuits‖ 5th Edition,. Oxford university press, 7th Edition, 2009. 2. Robert L. Boylestad, Louis Nashelsky, ―Electronic Devices and Circuits Theory, Pearson education, 9th Edition, 2008 3. Ronald J.Tocci, "Fundamentals of Pulse and Digital Circuits", PHI learning, 3rd Edition, 2008. 4. Millman J.Taub, "Pulse, Digital and Switching Waveforms", Tata McGrawHill,2nd Edition , 2007.