

ELECTRICAL CIRCUITS LABORATORY

II Semester: EEE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AEEB07	Core	L	T	P	C	CIA	SEE	Total
		-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48			Total Classes: 48			

OBJECTIVES:

The course should enable the students to:

- I. Understand the characteristics of basic electrical components.
- II. Perform the soldering of electrical and electronics components for smooth functioning.
- III. Calculate and verify the electrical quantities in series RL, RC and RLC circuit.
- IV. Measure the choke coil parameters and small transformer characteristics and electrical energy using single phase energy meter.
- V. Estimate electrical earthing resistance and study its importance.

COURSE OUTCOMES (COs):

CO 1: Understand the various nomenclature used to study the characteristics of DC networks and design of different wiring connections for various applications..

CO 2: Perform the soldering of electrical and electronics components, apply the network reduction techniques indirectly to calculate electrical quantities.

CO 3: Determine parameters of choke coil, transformer and calculate impedance and current in electrical circuits.

CO 4: Evaluate Electrical Quantities Associated With Series RLC Circuit, Energy Meter And Observe Characteristics Of Alternating Quantities.

CO 5: Observe The Resonance Phenomena In Series, Parallel Circuits And Calculate Electrical Earthing Resistance.

COURSE LEARNING OUTCOMES (CLOs):

The students should enable to:

1. Understand the characteristics of basic electrical and electronics components.
2. Design the different conductor systems used in residential and light commercial wiring in accordance with the codes and authorities for installation.
3. Perform the soldering of electrical and electronics components for smooth functioning..
4. Determine the power consumed by fluorescent lamp.
5. Apply Ohm's law and Kirchhoff's laws to determine equivalent resistance, current and voltage in any branch of a circuit.
6. Measure the choke coil parameters and small transformer characteristics.
7. Calculate and verify the impedance in series RL , RC and RLC circuit.
8. Develop an circuit to generate current value with low voltage.
9. Calculate electrical quantities associated with series RLC circuit.
10. Measure the electrical energy using single phase energy meter.
11. Identify The Characteristics of Alternating Quantities With Its Instantaneous, Average And Root Mean Square Values.
12. Determine the resonant frequency in series RLC circuits..
13. Evaluate the resonant frequency In parallel RLC circuits.
14. Estimate electrical earthing resistance and study its importance.

LIST OF EXPERIMENTS	
Expt. 1	STUDY OF ELECTRICAL AND ELECTRONIC COMPONENTS AND THEIR SPECIFICATIONS
To identify the electrical and electronic components and selection of these components based on their specifications.	
Expt. 2	TYPES OF ELECTRICAL WIRING AND RESIDENTIAL HOUSE WIRING
Study the staircase wiring, fluorescent lamp wiring and corridor wiring; To implement residential house wiring using switches, fuse, indicator and lamp.	
Expt. 3	SOLDERING PRACTICE
To practice soldering and de-soldering for the electronic circuit by assembling and disassembling the resistors and capacitor in the given Printed Circuit Board (PCB).	
Expt. 4	MEASUREMENT OF POWER CONSUMED BY A FLUORESCENT LAMP
To obtain power consumed and power factor of a fluorescent lamp, operated at different voltages.	
Expt. 5	OHM'S LAW, KCL AND KVL
Verification of Ohm's law, KCL and KVL.	
Expt. 6	DESIGN OF CHOKE AND SMALL TRANSFORMER
Study the design concepts and assembly of prototype choke and small transformer.	
Expt. 7	DETERMINATION OF CIRCUIT IMPEDANCE
Calculation and verification of impedance and current of RL, RC and RLC series circuits.	
Expt. 8	STUDY OF CONSTANT CURRENT SOURCE
To develop a circuit which provides substantially constant current using a low voltage input source.	
Expt. 9	MEASUREMENT OF ELECTRICAL PARAMETERS
To measure the electrical quantities like voltage, current, power and power factor in RLC series circuit.	
Expt. 10	MEASUREMENT OF ELECTRICAL ENERGY
To measure the electrical energy using single phase and three phase energy meters	
Expt. 11	CHARACTERISTICS OF PERIODIC WAVEFORMS
Calculation of average value, RMS value, form factor, peak factor of sinusoidal and square waveform.	
Expt. 12	SERIES RESONANCE
Demonstrating resonance phenomena in series RLC circuits and measurements of resonance characteristics using hardware and digital simulation.	

Expt. 13	PARALLEL RESONANCE
Demonstrating resonance phenomena in parallel RLC circuits and measurements of resonance characteristics using hardware and digital simulation.	
Expt. 14	MEASUREMENT OF EARTH RESISTANCE AND EARTH POTENTIAL
Study of earthing and determination of earth resistance and earth potential.	
TEXT BOOKS:	
<ol style="list-style-type: none"> 1. A Chakrabarthy, “Electric Circuits”, DhanpatRai& Sons, 6th Edition, 2010 2. A Sudhakar, Shyammohan S Palli, “Circuits & Networks”, Tata McGraw- Hill, 4th Edition, 2010 3. Nesimiertugrul, “Labview for electric circuits, machines, drives, and laboratories”, prentice hall, 1st Edition, 2002. 	
REFERENCES:	
<ol style="list-style-type: none"> 1. John Bird, “Electrical Circuit Theory and technology”, Newnes, 2nd Edition, 2003. 2. C. L. Wadhwa, “Electrical Circuit Analysis including Passive Network Synthesis”, New Age International, 2nd Edition, 2009. 3. David A. Bell, “Electric circuits”, Oxford University Press, 7th Edition, 2009. 	