

## BASIC ELECTRICAL ENGINEERING LABORATORY

<b>I Semester : CSE /CSE (AI &amp; ML) / CSE (DS) / CSE (CS) / CSIT / IT</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AEEC04	Foundation	L	T	P	C	CIA	SEE	Total
		-	-	3	1.5	30	70	100
<b>Contact Classes: Nil</b>		<b>Tutorial Classes: Nil</b>		<b>Practical Classes: 42</b>			<b>Total Classes: 42</b>	
<b>Prerequisites: Linear Algebra and Calculus</b>								
<p><b>I. COURSE OVERVIEW:</b> The basic electrical simulation lab enable the measurement of voltage, current, resistance in complex AC and DC circuits using digital simulation.</p> <p><b>II. COURSE OBJECTIVES:</b> <b>The students will try to learn:</b></p> <p>I. Implement different circuits and verify circuit concepts using digital Simulation. II. Measure impedance of series RL, RC and RLC circuits. III. Prove the various theorems used to reduce the complexity of electrical network.</p> <p><b>III. COURSE SYLLABUS:</b></p> <p><b>Expt. 1 : OHM’S LAW, KVL AND KCL</b> Verification of Ohm’s, Verification of Kirchhoff’s current law and Voltage law using hardware and digital simulation.</p> <p><b>Expt. 2: MESH ANALYSIS</b> Determination of mesh currents using hardware and digital simulation.</p> <p><b>Expt. 3: NODAL ANALYSIS</b> Measurement of nodal voltages using hardware and digital simulation.</p> <p><b>Expt. 4: IMPEDANCE OF SERIES RL AND RC CIRCUIT</b> Examine the impedance of series RL and RC circuit using digital simulation.</p> <p><b>Expt. 5: IMPEDANCE OF SERIES RLC CIRCUIT</b> Measure the impedance of series RLC Circuit using hardware and digital simulation.</p> <p><b>Expt. 6: SINGLE PHASE AC CIRCUITS</b> Determination of average value, RMS value, form factor, peak factor of sinusoidal wave using digital simulation.</p> <p><b>Expt. 7: SUPERPOSITION AND MAXIMUM POWER TRANSFER THEOREM</b> Verification of superposition and maximum power transfer theorem using hardware and digital simulation.</p> <p><b>Expt. 8: THEVENINS AND NORTON’S THEOREM</b> Verification of Thevenin’s and Norton’s theorem using hardware and digital simulation.</p> <p><b>Expt. 9: SWINBURNE’S TEST</b> Predetermination of efficiency of DC shunt machine.</p> <p><b>Expt. 10: MAGNITETIZATION CHARACTERISTICS</b> Determine the critical field resistance from magnitetization characteristics of DC shunt generator.</p> <p><b>Expt. 11: BRAKE TEST ON DC SHUNT MOTOR</b> Study the performance characteristics of DC shunt motor by brake test.</p>								

**Expt. 12: SPEED CONTROL OF DC SHUNT MOTOR**

Verify the armature and field control techniques of DC shunt motor.

**Expt. 13: OPEN CIRCUIT AND SHORT CIRCUIT TEST ON SINGLE PHASE TRANSFORMER**

Determination of losses and efficiency of single phase transformer.

**Expt. 14: SYNCHRONOUS IMPEDENCE METHOD**

Determine the regulation of alternator using synchronous impedance method.

**IV. REFERENCE BOOKS:**

1. A Chakrabarti, "Circuit Theory", Dhanpat Rai Publications, 6<sup>th</sup> Edition, 2006.
2. William Hayt, Jack E Kemmerly S.M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, 7<sup>th</sup> Edition, 2010.
3. K S Suresh Kumar, "Electric Circuit Analysis", Pearson Education, 1<sup>st</sup> Edition, 2013.
4. Etter, "Introduction to MATLAB 7", Pearson Education, 1<sup>st</sup> Edition, 2008.

**V. WEB REFERENCES:**

1. <https://www.ee.iitkgp.ac.in>
2. <https://www.citchennai.edu.in>
3. <https://www.iare.ac.in>