

## NETWORK ANALYSIS LABORATORY

<b>III Semester: EEE</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AEEB12	Core	L	T	P	C	CIA	SEE	Total
		-	-	2	1	30	70	100
<b>Contact Classes: Nil</b>		<b>Tutorial Classes: Nil</b>		<b>Practical Classes: 42</b>			<b>Total Classes: 42</b>	
<p><b>COURSE OBJECTIVES:</b>  <b>The course should enable the students to:</b></p> <ol style="list-style-type: none"> <li>I. Apply network theorems to obtain the equivalent circuit of electrical networks.</li> <li>II. Calculate two port network parameters of different electrical circuits.</li> <li>III. Examine the circuit modeling in frequency domain.</li> <li>IV. Understand the virtual instrumentation using Lab VIEW.</li> </ol> <p><b>COURSE LEARNING OUTCOMES (CLOs):</b></p> <ol style="list-style-type: none"> <li>1. Apply the network reduction techniques directly and indirectly to calculate quantities associated with electrical circuit</li> <li>2. Prove the law of conservation of energy, superposition principle, reciprocity and maximum power transfer condition for the electrical network with DC excitation.</li> <li>3. Summarize the procedure of Thevenin's, Norton's and Milliman's theorems to reduce complex network into simple equivalent network</li> <li>4. Calculate Z, Y of two port network.</li> <li>5. Determine ABCD, h parameters of the two port network.</li> <li>6. Editing and building a VI, creating a sub VI.</li> <li>7. Generate signals of triangular wave, saw tooth, square wave and display of wave form, minimum, maximum values of wave form and modulation.</li> <li>8. Measure of Frequency using Lissajous patterns in Lab VIEW.</li> <li>9. Analyze VIs using FOR loop, WHILE loop, charts and arrays, graph.</li> <li>10. Relate various two port parameters and inter relationships between them.</li> <li>11. Apply source transformation technique to determine equivalent resistance and source current.</li> <li>12. Design of electrical network in frequency domain using digital simulation.</li> <li>13. Explore the knowledge and skills of employability to succeed in national and international level competitive examinations.</li> </ol>								
<b>LIST OF EXPERIMENTS</b>								
<b>Expt. 1</b>	<b>MESH AND NODAL ANALYSIS</b>							
Verification of mesh and nodal analysis using hardware.								
<b>Expt. 2</b>	<b>SUPERPOSITION AND RECIPROCITY THEOREMS</b>							
Verification of super position and reciprocity theorems using hardware.								

<b>Expt. 3</b>	<b>MAXIMUM POWER TRANSFER THEOREM</b>
Verification of maximum power transfer theorem using hardware.	
<b>Expt. 4</b>	<b>THEVENIN'S AND NORTON'S THEOREMS</b>
Verification of Thevenin's and Norton's theorems using hardware.	
<b>Expt. 5</b>	<b>COMPENSATION AND MILLIMAN'S THEOREM</b>
Verification of compensation and Milliman's theorems using hardware.	
<b>Expt. 6</b>	<b>IMPEDANCE (Z) AND ADMITTANCE (Y) PARAMETERS</b>
To calculate and verify 'Z' parameters and 'Y' parameters of two-port network	
<b>Expt. 7</b>	<b>TRANSMISSION (ABCD) AND HYBRID (H) PARAMETERS</b>
To calculate and verify 'ABCD' parameters and 'H' parameters of two-port network.	
<b>Expt. 8</b>	<b>VIRTUAL INSTRUMENTS (VI) USING LABVIEW</b>
Editing and building a VI, creating a sub VI.	
<b>Expt. 9</b>	<b>GENERATION OF COMMON WAVE FORMS USING LABVIEW</b>
Signal generation of triangular wave; saw tooth, square wave and display of wave form, minimum and maximum values of wave form and modulation.	
<b>Expt.10</b>	<b>FREQUENCY MEASUREMENT USING LABVIEW</b>
Frequency measurement using Lissajous figures in Lab View.	
<b>Expt. 11</b>	<b>STRUCTURES USING LABVIEW</b>
Using FOR loop, WHILE loop, charts and arrays, graph and analysis VIs.	
<b>Expt. 12</b>	<b>SERIES, PARALLEL AND CASCADE CONNECTION OF TWO PORT NETWORK</b>
To determine the equivalent parameters of series, parallel, cascade connection of two port network.	
<b>Expt. 13</b>	<b>SOURCE TRANSFORMATION</b>
Analysis of given circuit using source transformation technique	
<b>Expt. 14</b>	<b>MODELLING ELECTRICAL NETWORK IN FREQUENCY DOMAIN</b>
To learn modelling of electrical network in frequency domain using digital simulation.	

**Reference Books:**

1. Department Lab Manual.
2. A Chakrabarti, "Circuit Theory", Dhanpat Rai Publications, 6<sup>th</sup> Edition, 2006.
3. V K Mehta, Rohit Mehta, "Principles of Electrical Machines", 1<sup>st</sup> Edition, 2013.
4. I J Nagarath & D P Kothari, "Electrical Machines", 1<sup>st</sup> Edition, 2011.

**Web References:**

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