

### Network Analysis Lab

<b>Course Code</b>	23EC3251	<b>Year</b>	I	<b>Semester</b>	II
<b>Course Category</b>	Engineering Sciences	<b>Branch</b>	ECE	<b>Course Type</b>	Lab
<b>Credits</b>	1.5	<b>L-T-P</b>	0-0-3	<b>Prerequisites</b>	Nil
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

#### Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Verify Kirchoff's laws and network theorems. L2
<b>CO2</b>	Measure time constants of RL & RC circuits. L3
<b>CO3</b>	Analyze behavior of RLC circuit for different cases. L4
<b>CO4</b>	Design resonant circuit for given specifications. L4
<b>CO5</b>	Characterize and model the network in terms of all network parameters. L5
<b>CO6</b>	Communicate concepts and technologies related to electrical network analysis effectively in written reports.

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#### Mapping of course outcomes with Program outcomes (CO/PO/PSO Matrix)

Note: 1-Weak correlation      2-Medium correlation      3-Strong correlation

\*-Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	3			1	1	1		1	3	1
CO2	2	2	2	2	3			1	1	1		1	3	1
CO3	2	2	2	2	3			1	1	1		1	3	1
CO4	2	2	2	2	3			1	1	1		1	3	1
CO5	2	2	2	2	3			1	1	1		1	3	1
CO6								1	1	3		2		
Average * (Rounded to nearest integer)	2	2	2	2	3			1		1		1	3	1

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#### Syllabus

Expt.No.	Contents	Mapped CO
1	Study of components of a circuit and Verification of KCL and KVL.	CO1
2	Verification of mesh and nodal analysis for AC circuits	CO1
3	Verification of Superposition, Thevenin's & Norton's theorems for AC circuits	CO1

4	Verification of maximum power transfer theorem for AC circuits	CO1
5	Verification of Tellegen's theorem for two networks of the same topology	CO1
6	Study of DC transients in RL, RC and RLC circuits	CO2
7	Study frequency response of various 1 <sup>st</sup> order RL & RC networks	CO2
8	Study the transient and steady state response of a 2 <sup>nd</sup> order circuit by varying its various parameters and studying their effects on responses	CO3
9	Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.	CO4
10	Determination of open circuit (Z) and short circuit (Y) parameters	CO5
11	Determination of hybrid (H) and transmission (ABCD) parameters	CO5
12	Measure two-port parameters of a twin-T network and study its frequency response.	CO5
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<b>Learning Resources</b>		
<ol style="list-style-type: none"> <li>1. M.E Van Valkenburg, Network Analysis–Prentice Hall of India, Revised 3<sup>rd</sup> Ed., 2019</li> <li>2. William H.Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, Engineering Circuit Analysis, 9th Ed., 2020</li> </ol>		
<b>Hardware Requirements</b>		
1. Regulated Power supplies, Analog/ Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/ Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components		
<b>Software requirements</b>		
Multisim/ Pspice /Equivalent simulation software tool, Computer Systems with required Specifications		
<b>e- Resources &amp; other Digital material</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://www.cdeep.iitb.ac.in/nptel/Electrical%20&amp;%20Comm%20Engg/Signals%20and%20System/TOC-M1.htm">http://www.cdeep.iitb.ac.in/nptel/Electrical%20&amp;%20Comm%20Engg/Signals%20and%20System/TOC-M1.htm</a></li> <li>2. <a href="http://www.cdeep.iitb.ac.in/nptel/Electrical%20&amp;%20Comm%20Engg/Signals%20and%20System/Course%20Objective.htm">http://www.cdeep.iitb.ac.in/nptel/Electrical%20&amp;%20Comm%20Engg/Signals%20and%20System/Course%20Objective.htm</a>.</li> <li>3. <a href="http://www.stanford.edu/~boyd.ee102">http://www.stanford.edu/~boyd.ee102</a></li> <li>4. <a href="http://www.ece.gatech.edu/users/bonnie/book">http://www.ece.gatech.edu/users/bonnie/book</a></li> <li>5. <a href="http://ocw.mit.edu">http://ocw.mit.edu</a></li> <li>6. <a href="https://www.youtube.com/playlist?list=PLC7D3EAEFA0CC0420&amp;app=desktop">https://www.youtube.com/playlist?list=PLC7D3EAEFA0CC0420&amp;app=desktop</a></li> <li>7. <a href="https://www.tutorialspoint.com/network_theory/network_theory_quick_guide.htm">https://www.tutorialspoint.com/network_theory/network_theory_quick_guide.htm</a></li> <li>8. <a href="https://nptel.ac.in/courses/108/105/108105159/">https://nptel.ac.in/courses/108/105/108105159/</a></li> </ol>		
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