NETWORK ANALYSIS LABORATORY

III Semester: EEE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AEEB12	Core	-	-	2	1	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 24				Total Classes: 24		

I. COURSE OVERVIEW:

The Network Analysis Laboratory is designed to give hands-on experience on virtual instrumentation through digital simulation techniques. These techniques enable the students to design and validate network theorems for DC and AC excitation, transient analysis, network functions and two port networks. Students are able to analyze domestic and industrial power networks during normal as well as abnormal conditions.

II. OBJECTIVES:

The course should enable the students to:

I The basic laws, network reduction techniques and theorems for different circuits.

II Two port network parameters of different electrical circuits.

III The circuit modeling in frequency domain.

IV The virtual instrumentation using LabVIEW.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Analyze** an electric circuit using nodal and mesh analysis.	Analyze
CO 2	**Apply** various network theorems for reducing complex networks into simple equivalent network.	Apply
CO 3	**Calculate** various parameters of two port network for analyzingdifferent electrical circuits.	Apply
CO 4	**Analyze** the virtual instrumentation (VI) using control loops,arrays, charts and graphs.	Analyze
CO 5	**Design** of electrical network in frequency domain using digitalsimulation.	Apply

IV. SYLLABUS:

LIST OF EXPERIMENTS

Expt. 1	**MESH AND NODAL ANALYSIS**
Verification of mesh and nodal analysis using hardware.	
Expt. 2	**SUPERPOSITION AND RECIPROCITY THEOREMS**
Verification of super position and reciprocity theorems using hardware.	
Expt. 3	**MAXIMUM POWER TRANSFER THEOREM**
Verification of maximum power transfer theorem using hardware.	
Expt. 4	**THEVENIN'S AND NORTON'S THEOREMS**
Verification of Thevenin's and Norton's theorems using hardware.	
Expt. 5	**COMPENSATION AND MILLIMAN'S THEOREM**

Verification of compensation and Milliman's theorems using hardware.	
Expt. 6	**IMPEDANCE (Z) AND ADMITTANCE (Y) PARAMETERS**
To calculate and verify 'Z' parameters and 'Y' parameters of two-port network	
Expt. 7	**TRANSMISSION (ABCD) AND HYBRID (H) PARAMETERS**
To calculate and verify 'ABCD' parameters and 'H' parameters of two-port network.	
Expt. 8	**VIRTUAL INSTRUMENTS (VI) USING LABVIEW**
Editing and building a VI, creating a sub VI.	
Expt. 9	**GENERATION OF COMMON WAVE FORMS USING LABVIEW**
Signal generation of triangular wave; saw tooth, square wave and display of wave form, minimum and maximum values of wave form and modulation.	
Expt.10	**FREQUENCY MEASUREMENT USING LABVIEW**
Frequency measurement using Lissajous figures in Lab View.	
Expt. 11	**STRUCTURES USING LABVIEW**
Using FOR loop, WHILE loop, charts and arrays, graph and analysis VIs.	
Expt. 12	**SERIES, PARALLEL AND CASCADE CONNECTION OF TWO PORT NETWORK**
To determine the equivalent parameters of series, parallel, cascade connection of two port network.	
Expt. 13	**SOURCE TRANSFORMATION**
Analysis of given circuit using source transformation technique	
Expt. 14	**MODELLING ELECTRICAL NETWORK IN FREQUENCY DOMAIN**
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, 6th Edition, 2006.
3. V K Mehta, Rohit Mehta, "Principles of Electrical Machines", 1st Edition, 2013.
4. I J Nagarath & D P Kothari, "Electrical Machines", 1st Edition, 2011.

Web References:

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

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS:

SOFTWARE: MATLAB R2015a and LabVIEW
HARDWARE: Desktop Computers (04 no.s)