	National Institute of Technology Meghalaya An Institute of National Importance	**CURRICULUM**

Programme	**Bachelor of Technology in Electrical and Electronics Engineering**	Year of Regulation	**2013-14**
Department	**Electrical Engineering**	Semester	**III**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EE 205	**Network Theory**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives		Course Outcomes		
	To introduce electric circuit solving methods		CO1	**Able to apply the knowledge of basic circuital law and various network reduction techniques for the analysis of electric and magnetically coupled circuits.**
	To teach the resonance characteristic of the circuit		CO2	**Able to acquire and apply knowledge of circuit theorem (Superposition, Thevenin's, Norton and others) for independent and dependent source. Able to acquire and apply knowledge of resonance in RLC series and parallel circuit.**
	To develop an ability and skill to solve the circuit by using laplace and Fourier transform		CO3	**Able to acquire and apply knowledge on Fourier series representation and RMS value computation of non-sinusoidal waveforms. Able to apply Laplace and Fourier transformations in evaluating various responses of electrical networks.**
	To develop an ability and skill to find the two-port network parameters		CO4	**Able to infer and evaluate transient response, steady state response, network functions and power relations in AC circuit.**
	To introduce the concept of graph, tree etc.		CO5	**Able to acquire and apply knowledge on two port network and finding the Z, Y, h, g, ABCD parameter for different circuit configuration. Able to acquire and apply knowledge on graph theory in reference to electrical circuit.**

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**3**	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
2	CO2	**3**	**3**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
3	CO3	**3**	**3**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
4	CO4	**3**	**3**	**3**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
5	CO5	**3**	**3**	**3**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**

SYLLABUS

No.	Content	Hours	COs
I	**Introduction to electrical circuits:** **Electrical Circuit and Network: Concept and Terminology, Classification of electrical networks, R-L-C Parameters, Voltage and current sources, Independent and dependent sources, Source transformation, Voltage-current relationship for passive elements, Kirchhoff's laws, Network reduction techniques-Series, Parallel, Series-parallel, Star to Delta transformation, Nodal and Mesh analysis. Concept of Self and Mutual inductance, Co-efficient of coupling, Dot convention and loop analysis.**	**07**	**CO1** **CO1** **CO1** **CO1**
II	**Network theorems:** **Statement and proof: Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Millman's theorem, Reciprocity theorem, Tellegen's theorem under the dependent and independent sources for DC and AC excitation.** **Resonance in AC circuits:** **Characteristics and properties of resonance circuits, Series and parallel resonance circuits, Selectivity, Bandwidth and Quality factor.**	**08**	**CO1** **CO2** **CO2** **CO2**
III	**Laplace transform and Transient analysis:** **Advantages of Laplace transform method, Definition and basic theorems of Laplace transform, Laplace transform of some basic functions and periodic functions, Inverse Laplace transform, Transient response of R-L, R-C, R-L-C networks using Laplace transform method with DC and AC excitation. Response to step, Impulse and ramp inputs.**	**09**	**CO3** **CO3** **CO4** **CO4**
IV	**Two port networks:** **Limitations Z, Y, ABCD, h-parameters, Conversion of one parameter to another parameter, Condition for reciprocity and symmetry, Two port network connections in series, parallel and cascaded.** **Network topology:** **Concept of Tree, Branch, Tree link, Incidence matrix, Tie-set matrix and Loop currents, Cut-set matrix and node pair potentials, Duality and Dual networks.**	**07**	**CO5** **CO5** **CO5** **CO5**
V	**Fourier series & Fourier transforms:** **Fourier series representation of non-sinusoidal waves, Discrete spectra, rms values of non-sinusoidal waves, Steady state response of linear circuits to non-sinusoidal waves, Power in such circuits, Applications to RL and RC circuits, Fourier transform of Signum and step functions.**	**05**	**CO3** **CO3** **CO4**
Total Hours		**36**	

Essential Readings

1. Franklin F. Kuo, "Network Analysis and Synthesis",John Wiley & Sons, Second Edition, 2006.
2. M. E. Van Valkenburg, "Network Analysis", Prentice-Hall of India Pvt. Ltd., Third Edition, 2014.
3. S. P. Ghosh and A. K. Chakraborty, "Network Analysis and Synthesis", McGraw Hill Education India Pvt. Ltd., Fourth Edition, 2010.
4. D. Roy Choudhary, "Networks and Systems", Second Edition, New Age International, 2013.

Supplementary Readings

1. W. H. Hayt and J. E. Kemmerley, "Engineering Circuit Analysis", Tata McGraw Hill, Eighth Edition, 2013.
2. A. Chakrabarti, "Circuit Theory: Analysis and Synthesis", Sixth Edition, Dhanpat Rai& Co., 2014.
3. C. L. Wadhwa, "Network Analysis and Synthesis", New Age International Publishers, 2007
4. Donald E. Scott, "An Introduction to Circuit analysis: A System Approach", New edition McGraw Hill Inc., 1987.