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

Programme	**Bachelor of Technology in Electrical and Electronics Engineering**	Year of Regulation	**2018-19**
Department	**Electrical Engineering**	Semester	**IV**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EE220	**Network Synthesis and Applications**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives	To introduce network functions and its characterisation	Course Outcomes	CO1	Able to **understand** the basic concepts of network functions, their response in the time and frequency domains and filters.
	To familiarise the students with elementary synthesis of network and its application		CO2	Able to **understand** the fundamental concepts of network synthesis of two-port passive networks.
			CO3	Able to **synthesize** an electrical network from a given impedance/ admittance function.
			CO4	Able to **learn** the characteristics of attenuators and various types of Filters.
			CO5	Able to **apply** the concept of indefinite admittance matrix (IAM) in network applications.
			CO6	

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	2	2	1	1	2	0	2	0	0	1	3	2	3
2	**CO2**	3	2	1	1	1	1	0	0	2	0	0	1	2	1	2
3	**CO3**	2	3	3	2	1	0	2	0	0	0	0	1	2	2	2
4	**CO4**	2	2	3	1	2	2	2	0	2	0	0	1	2	3	2
5	**CO5**	2	2	3	0	2	2	1	0	2	0	0	1	3	2	3

SYLLABUS			
No.	Content	Hours	COs
I	**Network functions and responses:** Concept of complex frequency, Driving point and Transfer functions for one port and two port networks, Poles and Zeros of network functions, Natural response and natural frequency, Significance of poles and zeros, Restriction on the location of the poles and zeros in the s-plane for driving point function and transfer function, Time domain behaviour from pole-zero plot. Frequency domain behaviour from pole-zero plot.	09	CO1
II	**Elements of realizability:** Elements of realizability theory, Hurwitz polynomials, Positive real functions, Properties of real immittance functions.	05	CO1 CO2
III	**Network synthesis:** Basic synthesis procedure, Methods of synthesis, Driving point synthesis of one port network with two types of elements: Synthesis of LC driving point immittances, Synthesis of RC driving point Impedances, Synthesis of RC impedances or RL admittances, Properties of RL impedances and RC admittances. Synthesis of RLC driving point functions.	09	CO2 CO3
IV	**Filter circuits and design:** Introduction to filter, Passive filters and Attenuators-classification and general relations in filters, Active filters, Advantages and application of active filters.	08	CO1 CO4
V	**Indefinite admittance matrix:** Introduction to indefinite admittance matrix (IAM), Properties and application of IAM.	05	CO1 CO5
	Total Hours	36	

Essential Readings

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

Supplementary Readings

1. A. Chakrabarti, "Circuit Theory: Analysis and Synthesis", Sixth Edition, Dhanpat Rai & Co., 2014.
2. C. L. Wadhwa, "Network Analysis and Synthesis", New Age International Publishers, 2007.
3. W. H. Hayt and J. E. Kemmerley, "Engineering Circuit Analysis", Tata McGraw Hill, Eighth Edition, 2013.