Devi Ahilya University, Indore, India Institute of Engineering & Technology				**II Year B.E. (Electronics and Instrumentation Engg.) (Full Time)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
EIR3C4	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
NETWORK ANALYSIS	**3**	**1**	**1**	**3**	**1**	**1**	**5**
Duration of Theory Paper: 3 Hours							

Learning Objectives:

1. To learn techniques of solving circuits involving different active and passive elements.
2. To analyze the behavior of the circuit's response in time domain.
3. To analyze the behavior of the circuit's response in frequency domain.
4. To understand the significance of network functions.

Prerequisites: Basic course in Electrical

COURSE CONTENTS

UNIT-I

Circuit fundamental and tools of analyzing Network: Elements, Sources, their characteristics, source transformations, Kirchhoff's law, node and loop analysis, D-Y transformation, Network Theorems: Superposition, Reciprocity, Thevenin's, Norton's , Millman and Maximum Power Transfer Theorem, Coupled circuits, Graph Theory

UNIT-II

Time domain analysis of circuits: Transient and steady state analysis of first order and second order systems, initial and final conditions in networks, Solution of I, II and Higher order differential equation

UNIT-III

Two Port Networks: Various network parameters, two port parameters – z-parameter, y-parameter, transmission parameter and hybrid parameter, relationships, Interconnection of two-two port networks, terminated two port network.

UNIT-IV

Laplace Transforms and Fourier analysis: Basic theorems for Laplace transform, solution of circuit problems using Laplace transform, Waveform synthesis, Theorem in transform domain, Fourier analysis of complex waves, symmetries, introduction to Fourier transforms.

UNIT-V

Network Synthesis: Network functions, significance of poles and zeros, Physical realizability condition, Hurwitz test, Synthesis of one port network, properties of LC immittances, foster realization of LC circuits, ladder development and Cauer forms, properties of RC immittances and synthesis of RC circuits.

Learning Outcomes:

Upon Completing the Course, Student will able to:

1. Understand behavior of different circuits and their response using various circuit analysis tools and theorems
2. Understand the analysis in time domain and frequency domain.
3. Understand basic concepts regarding the system definition mathematically and associated network function.
4. Understand the concept of Network synthesis.

BOOKS RECOMMENDED:

[1] M.E.Van Valkenburg, Network Analysis, 3/e, Pearson Education.
[2] Franklin F.Kuo, Network Analysis and Synthesis, 2/e, John Wiley & Sons, 2003
[3] Donald Scott, An Introduction to Circuit Analysis: A System Approaches, Electrical Engineering Series, McGraw-Hill International Editions., 1987
[4] T.S.K.V. Iyer, Theory and Problem in Circuit Analysis, TMH Outline Series, Tata McGraw-Hill Publishing Company Ltd, New Delhi., 2000
[5] Gyanendra K.Mithal & Ravi Mithal, Network Analysis including Transmission Line, 14/e, Khanna Publishers, New Delhi., 2001

List of Practical Assignments:

During the learning of course, students need to do assignments:

1. Introduction to various components used in circuit analysis laboratory.
2. Experimental verification of Kirchoff's voltage law and Kirchoff's current law.
3. Experimental verification of Thevenin's theorem.
4. Experimental verification of Nortan's theorem.
5. Experimental verification of Superposition theorem.
6. Experimental verification of Maximum Power transfer theorem.
7. Experimental verification of Reciprocity theorem.
8. Calculation of z-parameters for a two port network.
9. Calculation of y-parameters for a two port network.
10. Calculation of ABCD-parameters for a two port network.
11. Experimental verification for series and parallel interconnection of a two port network.
12. Transient response analysis of a first order and second order circuit.
13. Experimental verification for Fourier series.