

II B.Tech – I Semester
(20EE3001) ELECTRICAL CIRCUIT ANALYSIS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre-Requisites: Applied Physics, Calculus, Basic Electrical Circuits

Course Objectives:

- To study the transient behaviour of electrical networks with DC, pulse excitations.
- To study the transient behaviour of electrical networks with AC excitations.
- To study the performance of a network based on input and output excitation/response.
- To understand the realization of electrical network function into electrical equivalent passive elements.
- To understand the application of Fourier series and Fourier transforms for analysis of electrical circuits

UNIT-I: Transient Analysis in DC Circuits

Transient response of R-L, R-C, R-L-C circuits for DC and pulse excitations, Solution using differential equations and Laplace transforms.

UNIT-II: Transient Analysis in AC Circuits

Transient response of R-L, R-C, R-L-C circuits for AC excitations, Solution using differential equations and Laplace transforms.

UNIT-III: Two port network

Two port network parameters – Z, Y, ABCD, Hybrid, Inverse ABCD, Inverse Hybrid parameters and their relations, different interconnections of two port networks-series, Cascaded and parallel networks, lattice network.

UNIT-IV: Network Synthesis

Positive real function - basic synthesis procedure -Hurwitz Polynomials-Testing of positive real function- LC immittance functions - RC impedance functions and RL admittance function - RL impedance function and RC admittance function - Foster and Cauer methods

UNIT-V: Passive filters

Classification of filters, Characteristics of ideal filters

Course Outcomes:

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

S.No	Course Outcome	BTL
1.	Find the transient response of electrical networks for different types of excitations	L1
2.	Find parameters for different types of networks.	L1
3.	Realize electrical equivalent network for a given network transfer function.	L3
4.	Extract different harmonics components from the response of a electrical network.	L2

Correlation of COs with POs& PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	2	1
CO2	3	3	-	-	-	-	-	-	-	-	-	-	2	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	2	1
CO4	3	3	-	-	-	-	-	-	-	-	-	-	2	1

Text Books:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company, 6th edition
2. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)

Reference Books:

1. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd.
2. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O. Sadiku, McGraw Hill Education (India)
3. Electrical Circuit Analysis-2 by A Sudhakar, Shyammohan S Palli, McGraw Hill Education (India)
4. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthy, DhanpatRai&Co.
5. Electric Circuits by David A. Bell, Oxford publications
6. Electric Circuits– (Schaum’s outlines) by Mahmood Nahvi& Joseph Edminister, Adapted by K. Uma Rao, 5th Edition – McGraw Hill