

# INVERTIS UNIVERSITY BAREILLY

Established by UOEA of MP by 2<sup>nd</sup> of UGC Act 1978 and U.P. Act 22 of 2010

BEE301	Electrical Circuit Analysis	3L:1T:0P	4 credits
--------	-----------------------------	----------	-----------

**Course Outcomes:**

At the end of this course, students will demonstrate the ability to

- Apply network theorems for the analysis of electrical circuits.
- Obtain the transient and steady-state response of electrical circuits.
- Analyse circuits in the sinusoidal steady-state (single-phase and three-phase).
- Analyse two port circuit behavior.

**Module 1: Network Theorems (10 Hours)**

Superposition theorem, Thevenin theorem, Norton theorem, Maximum power transfer theorem, Reciprocity theorem, Compensation theorem, Analysis with dependent current and voltage sources. Node and Mesh Analysis. Concept of duality and dual networks.

**Module 2: Solution of First and Second order networks (8 Hours)**

Solution of first and second order differential equations for Series and parallel R-L, R-C, R-L-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response.

**Module 3: Sinusoidal steady state analysis (8 Hours)**

Representation of sine function as rotating phasor, phasor diagrams, impedances and admittances, AC circuit analysis, effective or RMS values, average power and complex power. Three-phase circuits. Mutual coupled circuits, Dot Convention in coupled circuits, Ideal Transformer.

**Module 4: Electrical Circuit Analysis Using Laplace Transforms (8 Hours)**

Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros. Frequency response (magnitude and phase plots), series and parallel resonances

**Module 5: Two Port Network and Network Functions (6 Hours)**

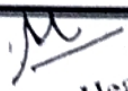
Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.


**Text / References:**

1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
2. D. Roy Choudhury, " Networks and Systems", New Age International Publications, 1998.

  
 Registrar  
 Invertis University  
 Bareilly

Invertis University, Bareilly
Effective from session 2020-21

  
 Head  
 Department of ECE/EE  
 Invertis University  
 Bareilly-243123, UP

  
 Dean  
 Faculty of Engineering & Technology  
 Invertis University  
 Bareilly-243123, UP



