

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE MODULES OF THE SUBJECT TAUGHT FOR THE ODD SESSION 2026-27

Course Syllabi with CO's

Faculty Name : Mrs. Geetha M A			Academic Year: 2026-27				
Department: Electrical & Electronics Engineering							
Course Code	Course Title	Core/ Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
1BEE303	Electric Circuit Analysis	PCC	Basic Electrical Engineering, Engineering Mathematics –I and II	3	2	0	42hours Theory + 23 Tutorial
Objectives	1. To familiarize the basic laws, source transformations, theorems and the methods of analyzing electrical circuits. 2. To explain the use of network theorems and the concept of resonance. 3. To familiarize the analysis of three-phase circuits, two port networks and networks with non-sinusoidal inputs. 4. To explain the importance of initial conditions, their evaluation and transient analysis of R-L and R-C circuits. 5. To impart basic knowledge on network analysis using Laplace transforms.						
Topics Covered as per Syllabus							
Module-1: Introduction to electric circuit, Classification of circuits, Concept of ideal and practical sources. Independent and dependent current and voltage sources, Source transformation and Source shifting, Star- Delta transformation. Analysis of networks by Mesh Current and Node voltage methods for DC and AC circuits with independent and dependent sources. Concept of Super-Mesh and Super-Node analysis. Duality. 16 Hr TLP: Chalk and Board, Problem based learning							
Module-2: Superposition theorem, Reciprocity Theorem, Thevenin’s theorem, Norton’s theorem and Maximum power transfer theorem. DC and AC circuit analysis of networks with and without dependent sources. 12 Hr TLP: Chalk and Board, Problem based learning							
Module-3: Resonant Circuits: Analysis of simple series R-L-C and parallel R-L-C circuits under resonances. Derivation of Resonant frequency, cut-off frequency, bandwidth and quality factor at resonance. Examples on simple series R-L-C and parallel R-L-C circuits. 07Hr Initial and Final Conditions: Definition of initial and final condition, Virtues of initial conditions, Behaviour of circuit elements for initial and final condition, Evaluation of initial conditions for series and parallel circuits. 05Hr Transient Analysis: Transient analysis of R-L and R-C circuits under DC excitations, Examples on simple R-L and R-C Circuits. 05Hr TLP: Chalk and Board, Problem based learning							

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Module-4: Introduction to Laplace transformation, Solution of electrical circuits using LT, Transformed

electrical circuit, Laplace transformation of standard signals: Impulse, Step, Ramp, Sinusoidal signals and shifted functions. shifting theorem, Initial and Final value theorems, Waveform Synthesis, Laplace transformation of periodic waveform. 08Hr

TLP: Chalk and Board, Problem based learning

Module-5: Analysis of three phase unbalanced systems, Neutral shifting method, Calculation of real and reactive Powers. 07Hr

Two Port networks: Definition, necessity of two port networks, Open circuit impedance, short circuit admittance and Transmission parameters, Relation among all the three parameters, Evaluation of two port networks for simple circuits. 08Hr

TLP: Chalk and Board, Problem based learning.

List of Text Books

TEXT BOOKS:

- 1 Engineering Circuit Analysis William H Hayt et al Mc GrawHill 8th Edition,2014
- 2 Engineering Circuit Analysis J David Irwin et al Wiley India 10th Edition,2014
- 3 Fundamentals of Electric Circuits Charles K Alexander Matthew N O Sadiku Mc Graw Hill 5th Edition,2013
- 4 Network Analysis M.E. Vanvalkenburg Pearson 3rd Edition,2014.

List of Reference Books

1. Electric Circuits Mahmood Nahvi Mc Graw Hill 5thEdition,2009
2. Introduction to Electric Circuits Richard C Dorf and James A Svoboda Wiley 9thEdition,2015
3. Circuit Analysis; Theory and Practice Allan H Robbins Wilhelm C Miller Cengage 5thEdition,2013

List of URLs, Text Books, Notes, Multimedia Content, etc

1. <https://www.youtube.com/watch?v=mNb1DpTjzbM>
2. <https://www.youtube.com/watch?v=U2kVAKhoJs8>
3. <https://nptel.ac.in/courses/108/105/108105159/>
4. <https://asnm-iitkgp.vlabs.ac.in/exp/rlc-circuit-analysis/simulation.html>
5. <https://www.circuitlab.com/editor/>

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Course Outcomes	At the end of the course the student will be able to:
	CO1: Apply fundamental laws, source transformations, and star-delta techniques to simplify electrical networks.
	CO2: Analyze AC and DC circuits using Mesh Current, Node Voltage, Super-Mesh, and Super-Node methods, network performance by applying core circuit theorems (Superposition, Thevenin's, Norton's, and Maximum Power Transfer).
	CO3: Determine resonant parameters, bandwidth, quality factors, and solve for initial/final transient conditions in RLC circuits.
	CO4: Solve linear circuit problems using Laplace transforms, waveform synthesis, and model circuits using two-port network parameters.
	CO5: Solve Unbalanced three-phase systems and also evaluate the performance of two-port networks.

CIE: IA test for 25 marks and that for the Continuous Course Assessment (CCA) is 25 marks
The student has to secure 40% marks or 20 out of 50 marks to qualify in the CIE of the theory component of PCC

Continuous Comprehensive Assessment (CCA) shall be conducted for a total of **25 marks**.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's) & Program Specific Outcomes (PSOs)

Course Code:	1BEE303	TITLE: Electric Circuit Analysis						Faculty Name:	Mrs. Geetha M A						
List of Course Outcomes	Program Outcomes (PO's) & Program Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
	CO-1	3	3	-	-	3	-	-	-	3	3	-	3	3	-
	CO-2	3	3	-	-	3	-	-	-	3	3	-	3	3	-
	CO-3	3	3	-	-	3	-	-	-	3	3	-	3	2	-
	CO-4	2	2	-	-	3	-	-	-	3	3	-	3	2	-
	CO-5	3	3	-	-	3	-	-	-	3	3	-	3	2	-

Note: 3= Strong Contribution 2 = Average Contribution 1 = Weak Contribution '-'= No Contribution

