

## ELECTRICAL CIRCUIT ANALYSIS-II

<b>Course Code</b>	20EE3301	<b>Year</b>	II	<b>Semester(s)</b>	I
<b>Course Category</b>	Professional Core	<b>Branch</b>	EEE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	ECA-I, DE&VC
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

<b>Course Outcomes</b>	
<b>Upon successful completion of the course, the student will be able to</b>	
CO1	Apply the concept of Laplace transforms and Fourier series to electrical signals. (L3)
CO2	Estimate various Network parameters (L4)
CO3	Analyse the transient behaviour of electrical networks in different domains for D.C and Sinusoidal excitations. (L4)
CO4	Analyse the balanced and unbalanced 3 phase circuits for power calculations. (L4)
CO5	Analyse the filter circuit for electrical circuits (L4)
CO6	Solve assignments based on concepts of two port networks, laplace transforms and fourier series, transient circuits, three phase circuits and filter concepts and submit a report.

<b>Contribution of Course Outcomes towards achievement of Program Outcomes &amp; Strength of correlations (3:High, 2: Medium, 1:Low)</b>														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												3	2
CO2		3											3	2
CO3		3											3	2
CO4		3											3	2
CO5		3											3	2
CO6									3	3			3	2

<b>SYLLABUS</b>		
<b>Unit No.</b>	<b>Contents</b>	<b>Mapped CO</b>
I	<p><b>Laplace transforms</b> – Definition and Laplace transforms of standard functions– Shifting theorem – Transforms of derivatives and integrals, Inverse Laplace transforms and applications.</p> <p><b>Analysis of Electric Circuits with Periodic Excitation:</b> Fourier series and evaluation of Fourier coefficients, Trigonometric and complex Fourier series for periodic waveforms, Application to Electrical Systems – Effective value and average value of non-sinusoidal periodic waveforms.</p>	<b>CO1 CO6</b>
II	<p><b>Network Parameters:</b> Impedance parameters, Admittance parameters, Hybrid parameters, Transmission (ABCD) parameters, conversion of Parameters from one form to other, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations- problems.</p>	<b>CO2 CO6</b>

III	<b>Transient Analysis:</b> Transient response of Series R-L, R-C and R-L-C circuits for D.C. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transform approach.	<b>CO3 CO6</b>
IV	<b>Analysis of three phase balanced circuits:</b> Phase sequence, star and delta connection of sources and loads, relation between line and phase quantities, analysis of balanced three phase circuits, measurement of active and reactive power. <b>Analysis of three phase unbalanced circuits:</b> Loop method, Star-Delta transformation technique, two-wattmeter method for measurement of three phase power.	<b>CO4 CO6</b>
V	<b>Filters: Classification of filters</b> -Low pass, High pass, Band pass and Band Elimination filters, Constant-k filters -Low pass and High Pass, Design of Filters	<b>CO5 CO6</b>

### Learning Resources

#### Text Books

1. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, 8th Edition McGraw-Hill, 2013
2. Fundamentals of Electric Circuits, Charles K. Alexander, Mathew N. O. Sadiku, 3<sup>rd</sup> Edition, Tata McGraw-Hill, 2019

#### Reference Books

1. Network Analysis, M. E. Van Valkenburg, 3<sup>rd</sup> Edition, PHI, 2019.
2. Network Theory, N. C. Jagan and C. Lakshminarayana, 1<sup>st</sup> Edition, B. S. Publications, 2012.
3. Circuits and Networks Analysis and Synthesis, A. Sudhakar, Shyam Mohan S. Palli, 5<sup>th</sup> Edition, Tata McGraw-Hill, 2017.
4. Engineering Network Analysis and Filter Design (Including Synthesis of One Port Networks)- Durgesh C. Kulshreshtha Gopal G. Bhise, Prem R. Chadha ,Umesh Publications 2012.
5. Circuit Theory: Analysis and Synthesis, A. Chakrabarti, Dhanpat Rai & Co., 2018, 7<sup>th</sup> Revised Edition.

#### Online Learning Resources:

1. <https://archive.nptel.ac.in/courses/117/106/117106108/>
2. <https://archive.nptel.ac.in/courses/108/105/108105159/>