II Year-I Semester		L	T	P	C
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ELECTRICAL CIRCUIT ANALYSIS-II (R1621021)

Prerequisite Course: Basic laws in circuit analysis, linear algebra, matrix analysis and complex calculus.

Course Description and Objectives:

This course aims at study of three phase systems, transient analysis, network synthesis and Fourier analysis for the future study and analysis of power systems.

Objectives:

1. To study the concepts of balanced three-phase circuits.
2. To study the concepts of unbalanced three-phase circuits.
3. To study the transient behavior of electrical networks with DC, pulse and AC excitations.
4. To study the performance of a network based on input and output excitation/response.
5. To understand the realization of electrical network function into electrical equivalent passive elements.
6. To understand the application of Fourier series and Fourier transforms for analysis of electrical circuits.

Course Outcomes:

Upon the course, the student will be able to achieve the following outcomes.

Cos	Course Outcomes	POs
1	Solve three- phase circuits under balanced condition.	3
2	Solve three- phase circuits under unbalanced condition.	3
3	Find out transient response of electrical networks with different types of excitations.	3
4	Estimate the different types of two port network parameters.	5
5	Represent electrical equivalent network for a given network transfer function.	4
6	Extract different harmonics components from the response of an electrical network.	4

Syllabus:

UNIT I:

Balanced Three phase circuits

Phase sequence- star and delta connection - relation between line and phase voltages and currents in balanced systems - analysis of balanced three phase circuits - measurement of active and reactive power in balanced three phase systems.

UNIT II:

Unbalanced Three phase circuits

Analysis of three phase unbalanced circuits: Loop method – Star-Delta transformation technique, Two wattmeter methods for measurement of three phase power.

UNIT III:

Transient Analysis in DC and AC circuits

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

UNIT IV:

Two Port Networks
Two port network parameters – Z, Y, ABCD and hybrid parameters and their relations, Cascaded networks - poles and zeros of network functions.

UNIT V:

Network synthesis
Positive real function - basic synthesis procedure - LC immittance functions - RC impedance functions and RL admittance function - RL impedance function and RC admittance function - Foster and Cauer methods.

UNIT VI:

Fourier analysis and Transforms
Fourier theorem- Trigonometric form and exponential form of Fourier series, Conditions of symmetry- line spectra and phase angle spectra, Analysis of electrical circuits to non sinusoidal periodic waveforms. Fourier integrals and Fourier transforms – properties of Fourier transforms and application to electrical circuits.

TEXT BOOKS:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, Mc Graw Hill Company, 6th edition.
2. Network synthesis: Van Valkenburg; Prentice-Hall of India Private Ltd.

REFERENCE BOOKS:

1. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)
2. Introduction to circuit analysis and design by TildonGlisson. Jr, Springer Publications.
3. Circuits by A.Bruce Carlson , Cengage Learning Publications
4. Network Theory Analysis and Synthesis by SmarajitGhosh, PHI publications
5. Networks and Systems by D. Roy Choudhury, New Age International publishers
6. Electric Circuits by David A. Bell, Oxford publications
7. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi,DhanpatRai&Co.