

**EE8251 CIRCUIT THEORY**

DETAILED SYLLABUS

**OBJECTIVES:**

- To introduce electric circuits and its analysis
- To impart knowledge on solving circuit equations using network theorems
- To introduce the phenomenon of resonance in coupled circuits.
- To educate on obtaining the transient response of circuits.
- To introduce Phasor diagrams and analysis of three phase circuits

**UNIT I BASIC CIRCUITS ANALYSIS**

Resistive elements - Ohm's Law Resistors in series and parallel circuits – Kirchoff's laws – Mesh current and node voltage - methods of analysis.

**UNIT II NETWORK REDUCTION AND THEOREMS FOR DC AND AC IRCUITS**

Network reduction: voltage and current division, source transformation – star delta conversion. Thevenin's and Norton Theorems – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem – Millman's theorem.

**UNIT III TRANSIENT RESPONSE ANALYSIS**

L and C elements -Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. sinusoidal input.

**UNIT IV THREE PHASE CIRCUITS**

A.C. circuits – Average and RMS value - Phasor Diagram – Power, Power Factor and Energy-Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & un balanced – phasor diagram of voltages and currents – power measurement in three phase circuits.

**UNIT V RESONANCE AND COUPLED CIRCUITS**

Series and parallel resonance – their frequency response – Quality factor and Bandwidth – Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits.

**TEXT BOOKS:**

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, edition, New Delhi, 2013.
2. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, 2013.
3. Allan H. Robbins, Wilhelm C. Miller, "Circuit Analysis Theory and Practice", Cengage Learning India, 2013.