Course Instructor: P.Sumathi

Course Objectives:

- Learn basic linear circuit analysis techniques
- Learn techniques for transient and sinusoidal steady-state circuit analysis.
- Analyze basic amplifier circuits built with op-amps
- Analyze some electronic building blocks built with op-amps
- Give students hands-on experience electronic equipment and circuits.

Course Contents:

**Analog Circuit Elements** – Resistor, Capacitor, Inductor, Concepts of Linearity and Passivity, Non-linear circuit elements, Incremental equivalent of nonlinear elements, Voltage and Current sources, Controlled sources, Active circuits, Practical circuit elements of different types.

**Analysis of Linear Circuits** – Kirchhoff’s laws, D-C analysis of resistive circuits, Time-domain analysis of a-c circuits, Sinusoidal steady state analysis of a-c circuits – notions of phasors, impedance, transfer function and frequency response, Frequency response vs transient response, Superposition theorem, Thevenin’s and Norton’s theorems, Two-port parameters, Analysis of circuits having controlled sources.

**Amplifiers** – Amplifier parameters, Controlled source models, Active devices as controlled sources, Different amplifier configurations using the OPAMP, Frequency response of OPAMP and OPAMP-based amplifiers, Power amplifier using OPAMP and transistors.

**Oscillators** – Amplifier with feedback, Condition of harmonic oscillation, RC oscillator circuits.

**Waveform Generators** – OPAMP as a comparator, Regenerative comparator, Timer, Relaxation oscillator, Non-sinusoidal waveform generator using comparator.

**D-C Power Supply** – Half-wave and Full-wave rectifiers, Shunt capacitor filter, Ripple and voltage regulation, Voltage regulator using zener diode, Active voltage regulator.

Text Books:


Reference Books:


Expected Outcome:

- Ability to analyze linear, time-invariant circuits under dc, transient and sinusoidal steady-state conditions
- Ability to simplify circuits by using Superposition, Thevenin’s and Norton’s theorems
- Ability to recognize, and analyze, basic electronic circuits like amplifiers, active filters,
- oscillators, function generators built with opamps as building blocks Handle basic electronic laboratory equipment like Cathode Ray Oscilloscope, Function Generator and D-C Power Supply
- Build basic circuits from commercially available components and test their performance.

Course Evaluation:

Theory (80%) + Lab (20%)

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<th>Component</th>
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