CURRICULUM DEVELOPMENT PLAN: Dr. V. Bhasker Raj

B.Sc. (H) Physics Ist Semester (Even Semester, 2024-2025)

Paper: Electrical Circuit Analysis; UPC: 2222011203; Credit: 04 (Lecture-02, Prac.-02)

Topics	Allocation of Lectures (hrs)	Month Wise schedule	Tutorial/assignment/ Presentation etc.
Unit 1: **Circuit Analysis:** Ideal voltage source, real voltage source, current source, Kirchhoff's current law, Kirchhoff's voltage law, node analysis, mesh analysis, Star and Delta conversion **DC Transient Analysis:** Charging and discharging with initial charge in RC circuit, RL circuit with initial current, time constant, RL and RC Circuits with source	08	January-February	• Syllabus Overview • Reference Books • Derivations • Problem-solving • Students' difficulties
Unit 3: **Network Theorems:** Principal of duality, Superposition theorem, Thevenin theorem, Norton theorem, Their applications in DC and AC circuits with more than one source, Maximum Power Transfer theorem for AC circuits, Reciprocity Theorem, Millman's Theorem, Tellegen's theorem **Two Port Networks**: Impedance (Z) Parameters, Admittance (Y) Parameters, Transmission Parameters, Impedance matching	10	March	• Derivations • Problem-solving • Students' difficulties • Assignments
Unit 2: **AC Circuit Analysis:** Sinusoidal voltage and current, Definitions of instantaneous, peak to peak, root mean square and average values, form factor and peak factor (for half-rectified and full-rectified sinusoidal wave, rectangular wave and triangular wave), voltage-current relationship in resistor, inductor and capacitor, phasor, complex impedance, power in AC circuits, sinusoidal circuit analysis for RL, RC and RLC Circuits, resonance in series and parallel RLC Circuits (Frequency Response, Bandwidth, Quality Factor), selectivity, application of resonant circuits	12	April-May	• Derivations • Problem-solving • Students' difficulties • Class Test • Previous year's Question Papers