**Lesson Plan**

**Name of Faculty :- SHRIKANT BHARDWAJ**

**Discipline :- Electrical Engineering**

**Semester :- 2ND Semester**

**Subject :- ELECTRICAL NETWORK**

**Lesson Plan Duration :- 15 Week( 15 FEB TO 14 June 2024)**

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| **Week** | **Theory** | | **Practical** | |
| **1st** | **Lecture Day** | **Topic** | **Practical Day** | **Topic** |
| **1st** | DC Network Theorems  INTRODUCTION | **1st**  E1/E2 | 1. Use voltmeter, ammeter to determine current through the given branch of a electric network by applying mesh analysis. |
| **2nd** | Mesh analysis |
| **3rd** | Nodal analysis using voltage and current sources | **2nd**  E1/E2 | 2.Use voltmeter, ammeter to determine current through the given branch of a electric network by applying node analysis. |
| **2nd** | **1st** | Superposition theorem | **1st**  E1/E2 | 3.Verification of Superposition Theorem. |
| **2nd** | Thevenin theorem |
| **3rd** | Norton theorem | **2nd**  E1/E2 | **4.** Verification of Thevenin’s theorem.  method. |
| **3rd** | **1st** | Maximum power transfer theorem |  | 5. Verification of Norton’s Theorems. |
| **2nd** | Active and passive network, Linear and Non Linear network |
| **3rd** | REVISION CHATER 1 | **2nd**  E1/E2 | 6. Verification of Maximum Power transfer Theorem. |
| **4th** | **1st** | AC Fundamentals  Generation of alternating Voltage and current. | **1st**  E1/E2 | 7. Observe the wave shape of an alternating supply on CRO and calculate average, RMS value, frequency and time period. |
| **2nd** | Difference between ac and dc, Equation of alternating quantity. |
| **3rd** | AC Terminology: waveform, cycle, frequency, time period, amplitude, instantaneous value, alternation, and their important relations (time period and frequency, angular velocity and frequency etc.) | **2nd**  E1/E2 | 8 .Measure input current, power, power factor of R-L series circuit and draw the power triangle. |
| **5th** | **1st** | Values of alternating voltage and current: Instantaneous value, peak value average value,  r.m.s. value, form factor and peak factor | **1st**  E1/E2 | Measure input current, power, power factor of R-C series circuit and draw the power triangle. |
| **2nd** | Vector representation of alternating quantities |
| **3rd** | Concept of phase, phase difference and phasors | **2nd**  E1/E2 | Measure input current, power, power factor of R-L-C series circuit and draw the power triangle. |
| **6th** | **1st** | Representation of electrical quantities through phasors | **1st**  E1/E2 | Use variable frequency supply to create resonance in given series R-L-C circuit or by using variable inductor or variable capacitor. |
| **2nd** | Addition of two alternating quantities: parallelogram method, component method |
| **3rd** | REVISION | **2nd**  E1/E2 | To determine current, p.f., active, reactive and apparent power in R-C parallel A.C. circuit. |
| **7th** | **1st** | UNIT III  Single Phase AC Series Circuits  A.C circuit containing pure Resistance, Inductance, Capacitance with the concept of power consumed, phase Angle, inductive and capacitive reactance etc. | **1st**  E1/E2 | To determine current, p.f., active, reactive and apparent power for given R-L-C parallel circuit with series connection of resistor and inductor in parallel with capacitor. |
| **2nd** | UNIT III  Single Phase AC Series Circuits  A.C circuit containing pure Resistance, Inductance, Capacitance with the concept of power consumed, phase Angle, inductive and capacitive reactance etc. |
| **3rd** | AC series circuit: R-L, R-C, along with the concept of phasor diagram, phase angle , Impedance, impedance triangle, power, power triangle etc. | **2nd**  E1/E2 | Use variable frequency supply create resonance in given parallel R-L-C circuit or by using variable inductor or capacitor. |
| **8th** | **1st** | AC series circuit: R-L-C along with the concept of phasor diagram, phase angle , Impedance, impedance triangle, power, power triangle etc. | **1st**  E1/E2 | Verify the relationship between phase and line values of current and voltages and power in balanced and unbalanced star connected load. |
| **2nd** | Concept of True power, apparent power and reactive power, Power factor and its significance, |
| **3rd** | disadvantages of low power factor, cause of low power factor, improvement of power factor. | **2nd**  E1/E2 | Verify the relationship between phase and line values of current and voltages and power in balanced and unbalanced delta connected load. |
| **9th** | **1st** | Active and reactive components of current | **1st**  E1/E2 | REVISION PRACTICAL |
| **2nd** | Resonance in RLC series circuit, Quality (Q) factor |
| **3rd** | REVISION | **2nd**  E1/E2 | REVISION PRACTICAL |
| **10th** | **1st** | UNIT IV  Single Phase AC Parallel Circuits  Concept of AC parallel circuit | **1st**  E1/E2 | REVISION PRACTICAL **-** |
| **2nd** | Methods of solving parallel AC circuit: vector method, admittance method, symbolic or J-method |
| **3rd** | Methods of solving parallel AC circuit: vector method, admittance method, symbolic or J-method | **2nd**  E1/E2 | REVISION PRACTICAL  **- do--** |
| **11th** | **1st** | Parallel Resonance, Q-factor | **1st**  E1/E2 | REVISION PRACTICAL |
| **2nd** | Comparison of series and parallel resonance. |
| **3rd** | Introduction to transient and Harmonics in A.C. circuits | **2nd**  E1/E2 |  |
| **12th** | **1st** | REVISION | **1st**  E1/E2 | REVISION PRACTICAL |
| **2nd** | UNIT V  Polyphase Circuit  Principle of generation of 3 –ø alternating emf. |
| **3rd** | Advantages of Polyphase circuit over single phase circuit, Phase Sequence. | **2nd**  E1/E2 | REVISION PRACTICAL |
| **13th** | **1st** | Types of three phase connections-Star connection and delta connection | **1st**  E1/E2 | REVISION PRACTICAL |
| **2nd** | Concept of balanced and unbalanced load. |
| **3rd** | Relation between phase and line quantities of star and delta connection | **2nd**  E1/E2 | REVISION PRACTICAL |
| **14th** | **1st** | REVISION | **1st**  E1/E2 | REVISION PRACTICAL |
| **2nd** | REVISION |
| **3rd** | REVISION | **2nd**  E1/E2 | REVISION PRACTICAL |
| **15th** | **1st** | REVISION | **1st**  E1/E2 | REVISION PRACTICAL |
| **2nd** | REVISION |
| **3rd** | REVISION | **2nd** | REVISION PRACTICAL |