**Lesson Plan**

**Name of Faculty :- Dayanand**

**Discipline :- Electrical Engineering**

**Semester :- Third Semester**

**Subject :- FUNDAMENTALS OF ELECTRICAL ENGINEERING**

**Lesson Plan Duration:- 15 Week**

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| **Week** | **Theory** | **Practical** |
| **1st** | **Lecture Day** | **Topic** | **Practical Day** | **Topic** |
| **1st** |  **Unit-1 Introduction**Basic Electrical Quantities | **1st** | **Practical-1 Ohm's law** Determination of voltage-current relationship in a dc circuit under specificphysical conditions and to draw conclusions (to verify ohm’s law) |
| **2nd** | Basic concept of charge, current |
| **3rd** | Basic concept of voltage, energy ,power & their units | **2nd** | **Practical-1 Ohm's law** Determination of voltage-current relationship in a dc circuit under specificphysical conditions and to draw conclusions (to verify ohm’s law) |
| **4th** | Application and Advantages of Electrical Energy |  |  |
| **2nd** | **5th** | Uses of electrical energy. |  | **Practical-2 Filament Lamp****A)** Measure the resistance of the cold lamp filament with the help of calculations.**B)** Measure the current drawn by the lamp at different voltages from zero to 220 volts and the resistance of lamp at different voltages, plot a graph between current & voltage. |
| **6th** |  **Unit-2 DC Circuits** |  |  |
| **7th** | Ohm’s law, resistances in series and parallel |  **4th** | **Practical-2 Filament Lamp****A)** Measure the resistance of the cold lamp filament with the help of calculations.**B)** Measure the current drawn by the lamp at different voltages from zero to 220 volts and the resistance of lamp at different voltages, plot a graph between current & voltage. |
| **8th** | Kirchoffs law & their application to solving electrical network problem |
| **3rd** | **9th** | Network theorems such as Thevenin’s theorem | **5th** | **Practical-3**To verify that Rt = R1+R2+…. Rn where R1, R2 Rn etc. are resistancesconnected in series |
| **10th** | Network theorems such as norton theorem |
| **11th** | Network theorems such as superposition & maximum power transfer theorem | **6th** | **Practical-3**To verify that Rt = R1+R2+…. Rn where R1, R2 Rn etc. are resistancesconnected in series |
| **12th** | Star-delta transformation |
| **4th** | **13th** |  **Unit-3 Batteries** Basic idea about primary and secondary cells  | **7th** | **Practical-4**To verify that 1/RT= 1/R1 +1/R2+……………..+1/Rn Where R1, R2 etc. are resistances connected in parallel |
| **14th** | Working principle, construction of Lead acid cell |
| **15th** | Applications of Lead acid cell & care of lead acid cell |  **8th** | **Practical-4**To verify that 1/RT= 1/R1 +1/R2+……………..+1/Rn Where R1, R2 etc. are resistances connected in parallel. |
| **16th** | Working principle, construction silver oxide cell & nickel cadmium cell |
| **5th** | **17th** | Applications of silver oxide cell & nickel cadmium cell | **9th** | **Practical-5**Verification of Kirchhoff’s current and voltage laws applied to DC circuits. a) To construct a circuit arrangement consisting of resistances in series ,parallel combination |
| **18th** | Charging methods used for lead acid accumulator  |
| **19th** | Grouping of cells in series and parallel (simple numerical problems). |  **10th** | **Practical-5**Verification of Kirchhoff’s current and voltage laws applied to DC circuits b) identification of node points in the circuitc) to see that algebraic sum of currents at node point is zero d) to see that algebraic sum of emfs and voltage drops in a closed loop is zero |
| **20th** | **Unit-4** **Magnetism and Electromagnetism**  Introduction to electromagnetism, Magnetic field  |
| **6th** | **21st** | Magnetic field around a straight current carrying conductor and a solenoid and methods to find its direction | **11th** | **Practical-5**Verification of Kirchhoff’s current and voltage laws applied to DC circuits b) identification of node points in the circuitc) to see that algebraic sum of currents at node point is zero d) to see that algebraic sum of emfs and voltage drops in a closed loop is zero |
| **22nd** | Force between two parallel current carrying conductors |
| **23rd** |  Force on a conductor placed in a magnetic field, concept of hystersis | **12th** | **Practical-6**To find ratio of inductance values of a coil having air /iron core respectively and to see the effect of introduction of a magnetic core on coil inductance. |
| **24th** | Series magnetic circuits , simple problems |
| **7th** | **25th** | Hystersis loop and concept of hystersis losses  | **13th** | **Practical-6**To find ratio of inductance values of a coil having air /iron core respectively and to see the effect of introduction of a magnetic core on coil inductance. |
| **26th** | **Unit-5****Electromagnetic Induction** Fardays law of electromagnetic induction, Lenz law ,fleming right hand rule & left hand rule  |
| **27th** | Principle of self and mutual induction Principle of self and mutually induced e.m.f. and simple problems Inductances in series and parallel | **14th** | **Practical-7**To construct an RL and RC circuit and to measureA) their impedanceB) phase angle between voltage and currentC) construct impedance triangle |
| **28th** | Energy stored in a magnetic field Concept of eddy currents, eddy current loss |
| **8th** | **29th** | **Unit-6****AC Fundamentals**Concept of A.C. generation (single phase and three phase) Difference between A.C and D.C  | **15th** |
| **30th** | Concept of alternating current and voltage, equation of instantaneous values, average value, r.m.s value, form factor, power factor etc. |
| **31st** | Concept of phase and phase difference.Representation of alternating sinusoidal quantities by vectors | **16th** | **Practical-7**To construct an RL and RC circuit and to measureA) their impedanceB) phase angle between voltage and currentC) construct impedance triangle |
| **32nd** | Phasor algebra (addition, subtraction, multiplication and division of complex quantities) |
| **9th** | **33rd** | **Unit-7****AC Circuits**AC through pure resistance, inductance and capacitance | **17th** | **Practical-8**Measurement of power and power factor of a single phase RLC circuit. To calculate kVA and kVAR |
| **34th** | Alternating voltage applied to RL,RC and RLC series circuits. |
| **35th** | Alternating voltage applied to RL,RC and RLC parallel circuits (impedance triangle, phasor diagram and their solutions) | **18th** | **Practical-8**Measurement of power and power factor of a single phase RLC circuit. To calculate kVA and kVAR. |
| **36th**  | Introduction to susceptance, conductance and admittance .Power in pure resistance, inductance, capacitance, RL, RC, RLC circuits |
| **10th** | **37th** | Active and reactive components of current and their significancePower factor and its practical significance | **19th** | **Practical-9**Testing a battery for its charged condition and to charge it |
| **38th** | **revision** |
| **39th** | **revision** | **20th** | **Practical-9**Testing a battery for its charged condition and to charge it |
| **40th**  | **revision** |
| **11th** | **41st** | **Unit-8****Poly-Phase Systems** |  **21st** | REVISION PRACTICAL- |
| **42nd** | Advantages of 3Ø over 1- Ø system |
| **43rd** | Star & delta connections | **22nd** | REVISION PRACTICAL |
| **44th**  | Derive relationship b/w phase Voltage(Vph),Line Voltage (VL ) and Phase Currrent (Iph), Line Current (I L) in star & delta connections |
| **12th** | **45th** | 3-phase balanced and unbalanced circuits | **23rd** | REVISION PRACTICAL |
| **46th** |  Power in 3-phase circuits |
| **47th** | **revision** | **24th** | REVISION PRACTICAL |
| **48th**  | **revision** |
| **13th** | **49th** | **revision** |  **25th** | REVISION PRACTICAL |
| **50th** | **revision** |
| **51st** | **revision** | **26th**  | REVISION PRACTICAL |
| **52nd**  | **revision** |
| **14th** | **53rd** | **revision** |  **27th** | REVISION PRACTICAL |
| **54th** | **revision** |
| **55th** | **revision** | **28th** | REVISION PRACTICAL |
| **56th**  | **revision** |
| **15th** | **57th** | **revision** | **29th** | REVISION PRACTICAL |
| **58th** | **revision** |
| **59th** | **revision** | **30th** | REVISION PRACTICAL |
| **60th**  | **revision** |