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| **GBN Govt. Polytechnic Nilokheri, Karnal****Electrical Engineering Department****Lesson plan**

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| **Name of Faculty** | Sh. Parveen Kumar |
| **Discipline** | Electrical Engineering |
| **Semester** | 4th  |
| **Subject** | Electrical Machines-I |
| **Lesson Plan Duration** | 16 weeks (From 06 March 2023 to June 2023) |
| **Work load [Theory + Practical] Per Week** | [04+02] |

 |
| Theory | Practical |
| Lecture Day | Topic(including assignment/test) | Practical day | Topic |
| 1st (Unit-1) |          Will Discuss Learning outcomes of Electrical Machine subject. | 1st | Introduction of EM lab various specifications of Motors, safety precautions etc. |
| 2st |          Introduction to Electrical Machines |
|          Definition of motor and generator, concept of torque |
| 3rd |          Electro-magnetically induced emf. |
| 4th |          Torque development due to alignment of two fields and the concept of torque angle |
| 5th |          Elementary concept of an electrical machine | 2nd | Measurement of the angular displacement of the rotor of a slip-ring induction motor on application of DC to stator of motor winding in sequence and simultaneously to each phase of rotor winding |
| 6th |          Comparison of generator and motor |
| 7th(Unit-II) |          Introduction of DC machines, its types |
| 8th |          Construction of DC machines |
| 9th |          Armature winding and its types | 3rd | Speed control of dc shunt motor |
| 10th |          Commutator and its function for generator and motor action |  (i) Armature control method  |
| 11th |          Factors determining induced EMF | (ii) Field control method |
| 12th |          Factors determining electromagnetic torque |   |
| 13th |          DC generator and its types | 4th | Evaluation of above practical’s. |
| 14th |          Voltage build-up in DC gen. |
| 15th |          Back emf, its significance , relationship between terminal voltage and back emf |
| 16th |          Armature reaction |
| 17th |          Commutation methods to improve commutation | 5th | Study of dc series motor with starter (to operate the motor on no load for a moment) |
| 18th |          Types of DC Motors, its performance, Characteristic of DC motors |   |   |
| 19th |          Speed control of DC motors, starters for DC motors(3 point and 4 point) |
| 20th |          Application of DC Motors, losses in DC machines |
| 21th |          Swinburne’s test to find out losses | 6th | Study of 3 point starter for starting D.C. shunt motor. |
|          First assignment will be given and tentative 1st sessional test/evaluation of sessional marks etc. |
| 22th |          Display and analysis of sessional marks |
| 23th(unit-3) |          Introduction of Transformers, types of T/Fm |
| 24th |          Construction of single phase transformer, |
| 25th |          Parts of a transformer | 7th | To perform open circuit and short circuit test for determining: (i) equivalent circuit (ii) the regulation and(iii)efficiency of a transformer from the data obtained from open circuit and short circuit test at full load |
| 26th |          Working principle of transformer |
| 27th |          EMF equation of T/fm |
| 28th |          Transformer at no load and its phasor diagram |
| 29th |          Transformer – neglecting voltage drop in the windings – Ampere turn balance – its phasor diagram | 8th | Evaluation of above practical. |
| 30th |          Mutual and leakage fluxes, leakage reactance |   |   |
| 31th |          Transformer on load, voltage drops and its phasor diagram |   |   |
| 32th |          Equivalent circuit diagrams of T/fm, Relation between induced emf and terminal voltage, regulation of a transformer mathematical relation |   |   |
| 33th |          Losses in transformer, various tests OC/SC Test to find out these losses and efficiency etc. | 9th | Revision of above practical for left out students. |
| 34th |          Auto transformer, construction, working and its application |
| 35th |          Different type of transformer including dry type transformer |
| 36th |          second assignment will be given and tentative 2nd sessional test/evaluation of sessional marks etc |
| 37th |          display and analysis of sessional marks. | 10th | Checking the polarity of the windings of a three phase transformer and connecting the windings in various configurations |
| 38th (unit-4) |          construction of 3-phase transformer |
| 39th |          accessories of transformers such as Conservator, breather,  |
| 40th |          Buchholz Relay, Tap Changer (off load and on load) (Brief idea) |
| 41th |          Types of three phase transformer i.e. delta-delta, delta-star | 11th | Finding the voltage and current relationships of primary and secondary of a three phase transformer under balanced load in various configurations conditions such as (a) Star-star (b) Star delta (c) Delta star (d) Delta-Delta configuring conditions |
| 42th |          ..star-delta, star-star. |
| 43th |          Parallel operation of transformer & its need |
| 44th |          Parallel operation conditions will be discussed |
| 45th |          Any left out topic due to Cl/leave etc. | 12th | Evaluation of above practical. |
| 46th |          Same as above |
| 47th |          Local visit to complaint centre to show parts /accessories of transformer |
| 48th |          On load/off load tap changer |
| 49th |          Distribution /power transformer | 13th | Revision of above practical for left out students if any. |
| 50th |          Cooling of transformer |
| 51th |          3rd assignment will be given |
| 52th |          Previous state boards question will be carried out, any other left out topic |
| 53th |          3rd sessional test | 14th | Viva-voce/preparation of practical sessional marks. |
| 54th |          Evaluation of 3rd test |
| 55th |          Display/analysis of 3rd sessional test |
| 56th |          Remedial will be taken if any shortcomings found |
| 57th |          Seminal/group discussion as per evaluation scheme |   |   |
| 58th |          -do- |   |   |
| 59th |          -do- |   |   |
| 60th |          -do- |   |   |
|  |          Preparation of sessional, practical award etc. |   |   |