**MAHAMAYA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCE,**

**NUAPADA**

**LESSON PLAN**

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| Discipline **Electrical Engg.** | Semester:-**4th**  | Name of the Teaching Faculty:-**Er. BARADA PRASAD SAHOO** |
| Subject:-**Energy Conversion-i** | No of Days/per Week Class Allotted :-**4+ 1{Tutorial)** | Semester From:- 10.03.2022 To:-10.06.2022No of Weeks:- **15** |
| **Week** | **Class Day** | **Theory/ Practical Topics** |
| 1st | 1st | 1. 1D.C Generator, Explain principle of operation |
| 2nd | 1. 2 Explain Constructional feature |
| 3rd | 1.3 Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch  |
| 4th | 1.4.1 Simple Lap winding (problems on winding diagram)  |
| 5th | Tutorial |
| 2nd | 1st | 1.4.2 Simple wave winding (problems on winding diagram)  |
| 2nd | 1.5.1 Explain Different types of D.C. machines Shunt, Series and Compound machine with problem solving methods.  |
| 3rd | 1.5.2 Explain Different types of D.C. machines Shunt, Series and Compound machine with problem solving methods.  |
| 4th | 1.6. Derive EMF equation of DC generators. (Solve problems) |
| 5th | Tutorial |
|  3rd | 1st | 1.7. Explain Armature reaction in D.C. machine & commutation. |
| 2nd | 1.8. Explain Methods of improving commutation (Resistance and emf commutatio |
| 3rd | 1.9. Explain role of inter poles and compensating winding. (solve problems) |
| 4th | 1.10. Characteristics of D.C. Generators with problem solving methods1.11. State application of different types of D.C. Generators. |
| 5th | Tutorial |
| 4th | 1st | 1.12. Concept of critical resistance causes of failure of development of emf. |
| 2nd | 1.13. Explain losses and efficiency of D.C. machines, condition for maximum efficiency and numerical problems. |
| 3rd | 1.14. Explain parallel operation of D.C. Generators. |
| 4th | Tutorial |
| 5th | 2.1 Explain basic working principle of DC motor |
| 5th | 1st | 2.2 State Significance of back emf in D.C. Motor.  |
| 2nd | 2.3 Derive voltage equation of Motor |
| 3rd | 2.4 Derive torque (Equation of Armature Torque and shaft Torque) (solve problems) |
| 4th | Tutorial |
| 5th | 2.5.1 Explain performance characteristics of shunt, series and compound motors and their application. (Solve problems) |
| 6th | 1st | 2.5.2 Explain performance characteristics of shunt, series and compound motors and their application. (Solve problems) |
| 2nd | 2.6.1 Explain methods of starting shunt, series and compound motors |
| 3rd | 2.6.1 Explain methods of starting shunt, series and compound motors, (solve problems) |
| 4th | Tutorial |
| 5th | 2.7 Explain speed control of D.C shunt motors by2.7.1 Flux control method |
| 7th | 1st | 2.7.2 Armature voltage (rheostatic) Control method. |
| 2nd | 2.7.3 Solve problems |
| 3rd | Tutorial |
| 4th | 2.8 Explain speed control of series motors by Flux control method and series parallel method. |
| 5st | 2.9 Explain determination of efficiency of D.C. Machine by break test method. |
| 8th | 1st | 2.10 Explain determination of efficiency of D.C. Machine by Swinburne’s Test method.  |
| 2nd | 2.11.1 Explain Losses & efficiency and condition for maximum power and solve numerical problems. |
| 3rd | 2.11.2 Explain Losses & efficiency and condition for maximum power and solve numerical problems. |
| 4th | Tutorial |
| 5st | 3.1 Explain working principle of transformer. |
| 9th | 1st | 3.2 Explains Transformer Construction – Arrangement of core & winding in different types of transformer – Brief ideas about transformer accessories such as conservator, tank, breather explosion vent etc. |
| 2nd | 3.3 Explain types of cooling methods |
| 3rd | 3.4 State the procedures for Care and maintenance |
| 4th | 3.5 Derive EMF equation |
| 5st | Tutorial |
| 10th | 1st | 3.6 Ideal transformer voltage transformation ratio |
| 2nd | 3.7 Explain Transformer on no load and on load phasor diagrams.3.8 Explain Equivalent Resistance. Reactance and Impedance. |
| 3rd | 3.9 Explain phasor diagram of transformer with winding Resistance and Magnetic leakage. Phasor diagram on load using upf, leading pf and lagging pf. |
| 4th | 3.10 Explain Equivalent circuit and solve numerical problems. |
| 5st | Tutorial |
| 11th | 1st | 3.11 Calculate Approximate & exact voltage drop of a Transformer. |
| 2nd | 3.12 Calculate Regulation of various loads and power factor. |
| 3rd | 3.13 Explain Different types of losses in a Transformer. (solve problems) |
| 4th | Tutorial |
| 5st | 3.14 Explain Open circuit test. |
| 12th | 1st | 3.15 Explain Short circuit test |
| 2nd | 3.16 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems) |
| 3rd | 3.17 Explain All Day Efficiency (solve problems) |
| 4th | Tutorial |
|  | 5st | 3.18 Explain determination of load corresponding to Maximum efficiency. |
| 13th | 1st | 3.19 Explain parallel operation of single phase transformer. |
| 2nd | Tutorial |
| 3rd | 4.1 Explain constructional features of Auto transformer |
| 4th | 4.2 Explain Working principle of single phase Auto Transformer. |
|  | 5st | 4.3 State Comparison of Auto transformer with an two winding transformer (saving of Copper) |
|  14th | 1st | 4.4 State Uses of Auto transformer. |
| 2nd | 4.5 Explain Tap changer with transformer (on load and off load condition) |
| 3rd | Tutorial |
| 4th | THREE PHASE TRANSFORMER5.1 State and show Type of connection – Star-Star, Star-Delta, Delta-Star and Delta – Delta. |
|  | 5st | 5.1.2 State and show Type of connection – Star-Star, Star-Delta, Delta-Star and Delta – Delta. |
|  15th | 1st | 5.2 Explain parallel operation and state conditions for Parallel operation. |
| 2nd | 5.3 Maintenance schedule of power transformer. |
| 3rd | Tutorial |