

**Department of Electrical Engineering**

**Govt. Polytechnic, Balasore**

**LESSON PLAN FOR ACADEMIC SESSION - 2022-23**

**ENERGY CONVERSION-I**

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| **Course Code : Th.1** | **Semester : 4th** |
| **Total Periods : 75 Periods** | **Examination : 3 Hours** |
| **Lecture Periods : 4 P/Week** | **Internal Assessment : 20 Marks** |
| **Tutorial : -1P/week** | **End Semester Examination : 80 Marks** |
| **Maximum Marks : 100** |  |
| **Semester From Date : 14.02.2023 To Date :** | |
| **Name of Teaching Faculty: Sri Biswajit Mallik(Sr. Lect. Electrical)** | |

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| WEEK | PERIOD | TOPIC |
| 1st | 1st | Introduction to electrical machine  D.C Generator |
| 2nd | Explain principle of operation  Explain Constructional feature |
| 3rd | Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch. |
| 4th | Simple Lap and wave winding (problems on winding diagram) |
| 5th | Explain Different types of D.C. machines i.e. Shunt, Series machine with problem solving methods. |
| 2nd | 1st | Explain Different types of D.C. machines i.e. Compound machine with problem solving methods. |
| 2nd | Derive EMF equation of DC generators. (Solve problems) |
| 3rd | Explain Armature reaction in D.C. machine. |
| 4th | Explain commutation in D.C. machine. |
| 5th | Explain Methods of improving commutation (Resistance and emf commutation) |
| 3rd | 1st | Explain role of inter poles and compensating winding. (solve problems) |
| 2nd | Characteristics of D.C. Generators with problem solving methods |
| 3rd | Characteristics of D.C. Generators with problem solving methods |
| 4th | State application of different types of D.C. Generators. |
| 5th | Concept of critical resistance causes of failure of development of emf. |
| 4th | 1st | Explain losses of D.C. machines & numerical problems. |
| 2nd | Explain efficiency of D.C. machines, condition for maximum efficiency and numerical problems. |
| 3rd | Explain parallel operation of D.C. Generators. |
|  | 4th | Explain parallel operation of D.C. Generators. |
|  | 5th | Introduction to D. C. MOTORS |
| 5th | 1st | Explain basic working principle of DC motor |
|  | 2nd | State Significance of back emf in D.C. Motor. |
|  | 3rd | Derive voltage equation of Motor |
| 4th | Derive torque (Equation of Armature Torque and shaft Torque) (solve problems) |
| 5th | Explain performance characteristics of shunt motors and their application. (Solve problems) |
| 6th | 1st | Explain performance characteristics of series motors and their application. (Solve problems) |
| 2nd | Explain performance characteristics of compound motors and their application. (Solve problems) |
| 3rd | Explain methods of starting shunt, series and compound motors, (solve problems) |
| 4th | Solve problems on dc motors. |
| 5th | Explain speed control of D.C shunt motors by  Flux control method |
| 7th | 1st | Armature voltage (rheostatic) Control method. |
| 2nd | Solve problems on speed control of D.C shunt motors . |
| 3rd | Explain speed control of series motors by Flux control method. |
| 4th | Explain speed control of series motors by series parallel method. |
| 5th | Explain determination of efficiency of D.C. Machine by break test method. |
| 8th | 1st | Explain determination of efficiency of D.C. Machine by Swinburne’s Test method. |
| 2nd | Explain Losses & efficiency |
| 3rd | Explain condition for maximum power. |
| 4th | Solve numerical problems on losses, efficiency and maximum power. |
| 5th | **SINGLE PHASE TRANSFORMER**  Explain working principle of transformer. |
| 9th | 1st | Explains Transformer Construction – Arrangement of core & winding in different types of transformer |
| 2nd | Brief ideas about transformer accessories such as conservator, tank, breather explosion vent etc. |
| 3rd | Explain types of cooling methods |
| 4th | State the procedures for Care and maintenance |
| 5th | Derive EMF equation |
| 10th | 1st | Ideal transformer voltage transformation ratio |
| 2nd | Explain Transformer on no load and on load phasor diagrams. |
| 3rd | Explain phasor diagram of transformer with winding Resistance and Magnetic leakage. Phasor diagram on load using upf, leading pf and lagging pf. |
| 4th | Explain Equivalent circuit and solve numerical problems. |
| 5th | Calculate Approximate & exact voltage drop of a Transformer. |
| 11th | 1st | Calculate Regulation of various loads and power factor. |
| 2nd | Explain Different types of losses in a Transformer. |
| 3rd | Solve problems on losses of transformer. |
| 4th | Explain Open circuit test. |
| 5th | Explain Short circuit test. |
| 12th | 1st | Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems) |
|  | 2nd | Explain All Day Efficiency |
| 3rd | Solve problems on all day efficiency. |
| 4th | Explain determination of load corresponding to Maximum efficiency. |
| 5th | Explain parallel operation of single phase transformer |
| 13th | 1st | **AUTO TRANSFORMER**  Explain constructional features |
| 2nd | Explain Working principle of single phase Auto Transformer. |
| 3rd | State Comparison of Auto transformer with an two winding transformer (saving of Copper) |
| 4th | State Comparison of Auto transformer with an two winding transformer (saving of Copper) |
| 5th | State Uses of Auto transformer. |
| 14th | 1st | Explain Tap changer with transformer (on load and off load condition) |
| 2nd | **INSTRUMENT TRANSFORMERS**  Explain Current Transformer |
| 3rd | Potential Transformer |
| 4th | Define Ratio error, Phase angle error, Burden |
| 5th | Define Ratio error, Phase angle error, Burden |
| 15th | 1st | Uses of C.T. and P.T. |
| 2nd | Tutorial |
| 3rd | Tutorial |
| 4th | Tutorial |
| 5th | Tutorial |

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Teaching Faculty Balasore

Academic Coordinator Principal

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