| LESSON PLAN |
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| JHARSUGUDA ENGINEERING SCHOOL,JHARSUGUDA |
| Name of the Faculty: SUPRASAD PAL  | Academic Year:2023-24 |
| Course No.: Th-2 | Course Name: ENERGY CONVERSION - II |
| Program: Diploma | Branch:Electrical  |
| Year/Sem: 3RD / V  | Section: |

| **Week No.** | **Period** | **Time****(min)** | **Unit/****Chapter** | **Topic to be covered** | **Teaching method** |
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| 1st  |  | 55 | 1 | Types of Alternator and their constructional features  | Black board |
|  | 55 | 1 | Basic Working principles of Alteranator and the relation between speed and frequency | Black board |
|  | 55 | 1 | Terminology in armature winding and expression for winding factors | Black board |
|  | 55 | 1 | Explain harmonics , its causes and impact on winding factor  | Black board |
| 2nd  |  | 55 | 1 | Emf equation on Alternator and numerical solving  | Black board |
|  | 55 | 1 | Explain armature reaction and its effect on emf at a different power factor of load  | Black board |
|  | 55 | 1 | The vector diagram of loaded Alternator  | Black board |
|  | 55 | 1 | Solving of numerical problems  | Black board |
| 3rd  |  | 55 | 1 | Testing of Alternators. | Black board |
|  | 55 | 1 | Solving of numerical problems  | Black board |
|  | 55 | 1 | Determination of voltage regulation of Alternator by direct loading and synchronous impedance method .  | Black board |
|  | 55 | 1 | Solving of numerical problems  | Black board |
| 4th |  | 55 | 1 | Parallel operation of Alternator using synchro-scope and dark and bright lamp method. | Black board |
|  | 55 | 1 | Explain distribution of load by parallel connected Alternators. | Black board |
|  | 55 | 2 | Constructional feature of synchronous motor. | Audio &Video in Smart Class  |
|  | 55 | 2 | Principle of operation, concept of load angle and derivation of torque and power developed. | Black board |
| 5th |  | 55 | 2 | Effect of varying load with constant excitation. | Black board |
|  | 55 | 2 | Effect of varying excitation with constant load. | Black board |
|  | 55 | 2 | Power angle characteristics of cylindrical rotor motor. | Black board |
|  | 55 | 2 | Explain effect of excitation on armature current and power factor  | Black board |
| 6th  |  | 55 | 2 | Hunting in synchronous motor and function of damper bars. | Black board |
|  | 55 | 2 | Method of starting of synchronous motor and its application  | Black board |
|  | 55 | 3 | Production of rotating magnetic field. | Audio &Video in Smart Class  |
|  | 55 | 3 | Constructional feature of squirrel cage and slip ring induction motor | Black board |
| 7th  |  | 55 | 3 | Working principles of 3-phase induction motor and definition of slip speed , slip and relation of slip with rotor quantities  | Black board |
|  | 55 | 3 | Derive expression of torque during starting and running condition and derivation of condition of maximum torque. | Black board |
|  | 55 | 3 | Solving of numerical problems. | Black board |
|  | 55 | 3 | Torque slip characteristics, derivation relation between full load torque and starting torque.  | Black board |
| 8th |  | 55 | 3 | Solving of numerical problems. | Black board |
|  | 55 | 3 | Establish the relation between rotor copper loss , rotor output and gross torque and relationship of slip with rotor copper loss  | Black board |
|  | 55 | 3 | Solving of numerical problems. | Black board |
|  | 55 | 3 | Methods of starting and different types of starters used for 3-phase induction motor  | Black board |
| 9th  |  | 55 | 3 | Explains speed control by voltage control, rotor resistance control , pole changing , frequency control methods  | Black board |
|  | 55 | 3 | Plugging as applicable to 3-phase induction motor. | Black board |
|  | 55 | 3 | Describe different types of motor enclosures  | Black board |
|  | 55 | 3 | Explain principles of induction generators and state its applications. | Black board |
| 10th  |  | 55 | 4 | Explains ferrari’s principles. | Black board |
|  | 55 | 4 | Explain double revolving field theory and cross field theory to analyze starting torque of 1- phase induction motor.  | Black board |
|  | 55 | 4 | Explain working principle, torque field characteristics, performance characteristics and application of split phase motor , capacitor statrt motor  | Black board |
|  | 55 | 4 | Capacitor start capacitor run motor , permanent capacitor type motor  | Black board |

|  11th |  | 55 | 4 | Shaded pole motor  | Black board |
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|  | 55 | 4 | Explain the method to change the direction of rotation of above motors  | Black board |
|  | 55 | 5 | Construction, working principle , running characteristics and application of 1-phase series motors  | Black board |
|  | 55 | 5 | Construction, working principle and application of universal motor . | Black board |
|  12th  |  | 55 | 5 | Working principle of repulsion start motor | Black board |
|  | 55 | 5 | repulsion start induction run motor | Black board |
|  | 55 | 5 | repulsion induction motor. | Black board |
|  | 55 | 6 | Principle of stepper motor and classification.  | Audio &Video in Smart Class  |
|  13th  |  | 55 | 6 | Principle of variable reluctant stepper motor.  | Black board |
|  | 55 | 6 | Principle of permanent magnet stepper motor.  | Black board |
|  | 55 | 6 | Principle of hybrid stepper motor.  | Black board |
|  | 55 | 6 | Applications of stepper motor.  | Black board |
| 14th  |  | 55 | 7 | Explain grouping of winding, advantages  | Black board |
|  | 55 | 7 | Explain parallel operation of 3- phase transformers  | Audio &Video in Smart Class  |
|  | 55 | 7 | Explain tap changer (on / off load tap changing)  | Black board |
|  | 55 | 7 | Maintenance schedule of power transformer.  | Black board |
| 15th  |  | 55 |  | Revision of all topics  | Black board |
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|  | 55 |  | Semester Question and Answer discussion | Black board |
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Text Book:

1. Electrical Technology – II , B.L. Therja & A.K. Therja , S.Chand Publication
2. Text book of Electrical machines , K.R. Siddhapurah , D.B. Raval , Vikash publication
3. Electrical Technology , J.B. Gupta, S.K. Kataria & Sons
4. Electrical machines Asfaq Hussain , Dhanpat Rai & Sons Publication.
5. Electrical Machine S.K. Bhattacharya , TMH
6. Electrical Machines D.P. Kothari, I.J. Nagrath , MC Grawhill