## LESSION PLAN FOR ACADEMIC SESSION:- 2022-23

| Discipline:- Electrical Engineering | Semester:- 5th | Name of the teaching faculty:- SIBA SANKAR MAHAPA, Sr. Lect in E E |
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| Subject:-**Th.2** **ENERGY CONVERSION II** | No. of days/ per week class allotted:-4 | Semester from:-15-09-2022 TO 22-12-2022<br>No. of weeks:14 |
| Week | Class day | Theory |
| 1st | 1st (15.09.2022) | **1. ALTERNATOR:**<br>1.1. Types of alternator and their constructional features |
| | 2nd(16.09.2022) | 1.2. Basic working principle of alternator and the relation between speed and frequency. |
| 2nd | 1st(20.09.2022) | 1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor). |
| | 2nd(21.09.2022) | 1.4. Explain harmonics, its causes and impact on winding factor.<br>1.5. E.M.F equation of alternator. (Solve numerical problems). |
| | 3rd(22.09.2022) | 1.6. Explain Armature reaction and its effect on emf at different power factor of load. |
| | 4th(23.09.2022) | 1.7. The vector diagram of loaded alternator. (Solve numerical problems) |
| 3rd | 1st(27.09.2022) | 1.8. Testing of alternator (Solve numerical problems)<br>1.8.1. Open circuit test. 1.8.2. Short circuit test. |
| | 2nd(28.09.2022) | 1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems) |
| | 3rd(29.09.2022) | 1.10. Parallel operation of alternator using synchro-scope and dark & bright lamp method. |
| | 4th(30.09.2022) | 1.11. Explain distribution of load by parallel connected alternators. |
| 4th | 1st(11.10.2022) | **2. SYNCHRONOUS MOTOR:**<br>2.1. Constructional feature of Synchronous Motor<br>2.2. Principles of operation, concept of load angle |
| | 2nd (12.10.2022) | 2.3. Derive torque, power developed. |
| | 3rd (13.10.2022) | 2.4. Effect of varying load with constant excitation.<br>2.5. Effect of varying excitation with constant load. |
| | 4th (14.10.2022) | 2.6. Power angle characteristics of cylindrical rotor motor. |
| 5th | 1st (18.10.2022) | 2.7. Explain effect of excitation on Armature current and power factor. |
| | 2nd (19.10.2022) | 2.8. Hunting in Synchronous Motor.<br>2.9. Function of Damper Bars in synchronous motor and generator. |
| | 3rd (20.10.2022 | 2.10. Describe method of starting of Synchronous motor. |
| | 4th (21.10.2022) | 2.11. State application of synchronous motor. |

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| | 1st (25.10.2022) | **3. THREE PHASE INDUCTION MOTOR:**<br>3.1. Production of rotating magnetic field<br>3.2. Constructional feature of Squirrel cage and Slip ring induction motors. |
| | 2nd(26.10.2022) | 3.3. Working principles of operation of 3-phase Induction motor.<br>3.4. Define slip speed, slip and establish the relation of slip with rotor quantities. |
| | 3rd(27.10.2022) | 3.5. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems) |
| | 4th(28.10.2022) | 3.6. Torque-slip characteristics. |
| | 1st (01.11.2022) | 3.7. Derive relation between full load torque and starting torque etc. (solve numerical problems) |
| | 2nd(02.11.2022) | 3.8. Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems) |
| | 3rd(03.11.2022) | 3.8. Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems) |
| | 4th(04.11.2022) | 3.9. Methods of starting and different types of starters used for three phase Induction motor |
| | 1st (09.11.2022) | 3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods. |
| | 2nd (10.11.2022) | 3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods. |
| | 3rd (11.11.2022) | 3.11. Plugging as applicable to three phase induction motor.<br>3.12. Describe different types of motor enclosures. |
| | 1st (15.11.2022) | 3.13. Explain principle of Induction Generator and state its applications. |
| | 2nd (16.11.2022) | **4. SINGLE PHASE INDUCTION MOTOR:**<br>4.1. Explain Ferrari's principle. |
| | 3rd (17.11.2022) | 4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor |
| | 4th (18.11.2022) | 4.3. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors.<br>4.3.1. Split phase motor. 4.3.2. Capacitor Start motor. |
| | 1st (22.11.2022) | 4.3.3. Capacitor start, capacitor run motor.<br>4.3.4. Permanent capacitor type motor. |
| | 2nd (23.11.2022) | 4.3.5. Shaded pole motor.<br>. |
| | 3rd(24.11.2022) | 4.4. Explain the method to change the direction of rotation of above motors |
| | 4th (25.11.2022) | **5. COMMUTATOR MOTORS:**<br>5.1. Construction, working principle, running characteristic and application of single phase series motor. |

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| | 1st (29.11.2022) | 5.2. Construction, working principle and application of Universal motors |
| | 2nd(30.11.2022) | 5.3. Working principle of Repulsion start Motor, Repulsion start Induction run motor |
| | 3rd(01.12.2022) | 5.3. Working principle of Repulsion Induction motor. |
| | 4th(02.12.2022) | **6. SPECIAL ELECTRICAL MACHINE:** 6.1. Principle of Stepper motor |
| 12th | 1st (06.12.2022) | 6.2. Classification of Stepper motor |
| | 2nd (07.12.2022) | 6.3. Principle of variable reluctant stepper motor |
| | 3rd (08.12.2022) | 6.4. Principle of Permanent magnet stepper motor. |
| | 4th (09.12.2022) | 6.5. Principle of hybrid stepper motor |
| 13th | 1st(13.12.2022) | 6.6. Applications of Stepper motor. |
| | 2nd(14.12.2022) | **7. THREE PHASE TRANSFORMERS:** 7.1. Explain Grouping of winding, Advantages |
| | 3rd(15.12.2022) | 7.2. Explain parallel operation of the three phase transformers. |
| | 4th(16.12.2022) | 7.3. Explain tap changer (On/Off load tap changing) |
| 14th | 1st(20.12.2022) | 7.4. Maintenance Schedule of Power Transformers. |
| | 2nd(21.12.2022) | REVISION |
| | 3rd(22.10.2022) | REVISION |

**Teaching Faculty**

**Program Coordinator (E.E)**

**Academic Coordinator**

**PRINCIPAL**
**GOVT. POLYTECHNIC, NUAPADA**