Lesson Plan

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| **Name of Faculty** | **:-** | **Jaipal** |
| **Discipline** | **:-** | **Electrical Engineering** |
| **Semester** | **:-** | **Fifth Semester** |
| **Subject** | **:-** | **Electrical Machine -II** |

Lesson Plan Duration:- 15 Week

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| **Week** | **Theory** | | **Practical** | |
| **1st** | **Lecture Day** | **Topic** | **Practical Day** | **Topic** |
| **1st** | **Unit-1 Synchronous Machine**  Main constructional features of synchronous machine including commutator and brushless  excitation system | **1st** | **PRACTICAL-1**  To plot relationship between no load terminal voltage and excitation current in a synchronous  generator at constant speed |
| **2nd** | Generation of three phase emf |
| **3rd** | Production of rotating magnetic field in a three phase winding | **2nd** | **PRACTICAL-1**  To plot relationship between no load terminal voltage and excitation current in a synchronous  generator at constant speed |
| **4th** | Concept of distribution factor and coil span factor and emf equation Armature reaction at unity, lag and  lead power factor |
| **2nd** | **5th** | Operation of single synchronous machine independently supplying a load - Voltage  regulation by synchronous  impedance method | **3rd** | **PRACTICAL-2**  Determination of the relationship between the voltage and load current of an alternator,  keeping excitation and speed constant |
| **6th** | Need and necessary conditions of parallel operation of alternators Synchronizing an alternator (Synchroscope method) with the  bus bars |
| **7th** | Operation of synchronous machine as a motor –its starting methods |  | **PRACTICAL-2**  Determination of the relationship between the voltage and load current of an alternator,  keeping excitation and speed constant |

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|  | **8th** | Effect of change in excitation of a synchronous motor | **4th** |  |
| **3rd** | **9th** | Concept and Cause of hunting and its prevention | **5th** | **PRACTICAL-3**  Determination of the efficiency of alternator from the open circuit and short circuit test |
| **10th** | Rating and cooling of synchronous machines |
| **11th** | Applications of synchronous machines (as an alternator, as a  synchronous condenser) | **6th** | **PRACTICAL-3**  Determination of the efficiency of alternator from the open circuit and short circuit test |
| **12th** | REVISION UNIT-1 |
| **4th** | **13th** | REVISION UNIT-1 | **7th** | **PRACTICAL-4**  Parallel Operation of 3-Phase Alternators |
| **14th** | REVISION UNIT-1 |
| **15th** | **Unit-2 Induction Motors**  Salient constructional features of squirrel cage and slip ring 3-phase induction  motors | **8th** | **PRACTICAL-4**  Parallel Operation of 3-Phase Alternators |
| **16th** | Principle of operation, slip and its significance |
| **5th** | **17th** | Locking of rotor and stator fields  Rotor resistance, inductance, emf and current | **9th** | **PRACTICAL-5**  Study of ISI/BIS code for 3-phase induction motors |
| **18th** | Relationship between copper loss and the motor slip |
| **19th** | Power flow diagram of an induction motor | **10th** | **PRACTICAL-5**  Study of ISI/BIS code for 3-phase induction motors |
| **20th** | Factors determining the torque |
| **6th** | **21st** | Torque-slip curve, stable and unstable zones | **11th** | **PRACTICAL-6**  Perform at least two tests on 3-phase induction  motors as per BIS code |
| **22nd** | Effect of rotor resistance upon the torque slip relationship |

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| **23rd** | Double cage rotor motor and its applications | **12th** | **PRACTICAL-6**  Perform at least two tests on 3-phase induction  motors as per BIS code |
| **24th** | Starting of 3-phase induction motors, DOL, star-delta, auto transformer |
| **7th** | **25th** | Causes of low power factor of induction motors | **13th** | **PRACTICAL-7**  To reverse the direction of rotation of 3-phase induction  motor |
| **26th** | Testing of 3-phase motor on no load and blocked rotor test and to  find efficiency |
| **27th** | Speed control of induction motor | **14th** | **PRACTICAL-7**  To reverse the direction of rotation of 3-phase induction  motor |
| **28th** | Harmonics and its effects, cogging and crawling in Induction Motors. |
| **8th** | **29th** | REVISION UNIT-2 | **15th** | **PRACTICAL-8**  To control speed of 3-phase induction motor |
| **30th** | REVISION UNIT-2 |
| **31st** | REVISION UNIT-2 | **16th** | **PRACTICAL-8**  To control speed of 3-phase induction motor |
| **32nd** | **Unit-3**  **(Fractional Kilo Watt (FKW)** Motors Single phase induction motors; Construction  characteristics and applications |
| **9th** | **33rd** | Nature of field produced in single phase induction motor | **17th** | **PRACTICAL-9**  Determination of efficiency by (a) no load test and blocked rotor test on an induction motor (b) direct loading of an induction motor (refer BIS code) |
| **34th** | Split phase induction motor  1 Capacitors start and run motor |
| **35th** | 2 Shaded pole motor | **18th** | **PRACTICAL-9**  Determination of efficiency by (a) no load test and blocked rotor test on an induction motor (b) direct loading of an induction motor (refer BIS code) |
| **36th** | 3 Reluctance start motor |
|  | **37th** | Alternating current series motor and universal motors |  | **PRACTICAL-10** |

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| **10th** | **38th** | Single phase synchronous motor 1 Reluctance motor | **19th** | Determination of effect of rotor resistance on torque speed curve of an induction motor |
| **39th** | 2 Hysteresis motor | **20th** | **PRACTICAL-10**  Determination of effect of rotor resistance on torque speed curve of an induction motor |
| **40th** | REVISION UNIT-3 |
| **11th** | **41st** | REVISION UNIT-3 | **21st** | **PRACTICAL-11**  To plot Torque-Slip Characteristics of 3-phase induction motor |
| **42nd** | REVISION UNIT-3 |
| **43rd** | **Unit-4**  **Special Purpose Machines** | **22nd** | **PRACTICAL-11**  To plot Torque-Slip Characteristics of 3-phase induction motor |
| **44th** | Construction and working principle of linear induction motor |
| **12th** | **45th** | Construction and working principle of stepper motor, | **23th** | **PRACTICAL-12**  Study of performance of a ceiling fan with or without Capacitor |
| **46th** | Construction and working principle of servomotor |
| **47th** | Construction and working principle of submersible motor | **24th** | **PRACTICAL-12**  Study of performance of a ceiling fan with or without Capacitor |
| **48th** | introduction to energy efficient motors. |
| **13th** | **49th** | REVISION UNIT-4 | **25th** | **PRACTICAL-13**  To study the effect of a capacitor on the Performance of single-phase induction motor |
| **50th** | REVISION UNIT-4 |
| **51st** | REVISION UNIT-4 | **26th** | **PRACTICAL-13**  To study the effect of a capacitor on the Performance of single-phase induction motor |
| **52nd** | REVISION UNIT-1 |

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| **14th** | **53rd** | REVISION UNIT-1 | **27th** | **PRACTICAL-14**  To reverse the direction of rotation of Single phase induction motor |
| **54th** | REVISION UNIT-2 |
| **55th** | REVISION UNIT-2 | **28th** | **PRACTICAL-14**  To reverse the direction of rotation of Single phase induction motor |
| **56th** | REVISION UNIT-3 |
| **15th** | **57th** | REVISION UNIT-3 | **29th** | **Revision** |
| **58th** | REVISION UNIT-4 |
| **59th** | REVISION UNIT-4 | **30th** | **Revision** |
| **60th** | REVISION UNIT-4 |