**Lesson Plan**

**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**  **Induction Motors**  Salient constructional features of squirrel cage and slip ring 3-phase induction  motors | **1st** | **PRACTICAL-1**  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) |
| **2nd** | Principle of operation, slip and its significance |
| **3rd** | Locking of rotor and stator fields  Rotor resistance, inductance, emf and current | **2nd** | **PRACTICAL-1**  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) |
| **4th** | Relationship between copper loss and the motor slip |
| **2nd** | **5th** | Power flow diagram of an induction motor | **3rd** | **PRACTICAL-2**  Determination of effect of rotor resistance on torque speed curve of an induction motor |
| **6th** | Factors determining the torque |
| **7th** | Torque-slip curve, stable and unstable zones | **4th** | **PRACTICAL-2**  Determination of effect of rotor resistance on torque speed curve of an induction motor |
| **8th** | Effect of rotor resistance upon the torque slip relationship |
| **3rd** | **9th** | Double cage rotor motor and its applications | **5th** | **PRACTICAL-3**  To study the effect of a capacitor on the starting and running of a single-phase induction motor  by changing value of capacitor and also to reverse the direction of rotation of a single phase  induction motor |
| **10th** | Starting of 3-phase induction motors, DOL, star-delta, auto transformer |
| **11th** | Causes of low power factor of induction motors | **6th** | **PRACTICAL-3**  To study the effect of a capacitor on the starting and running of a single-phase induction motor  by changing value of capacitor and also to reverse the direction of rotation of a single phase  induction motor |
| **12th** | Testing of 3-phase motor on no load and blocked rotor test and to find efficiency |
| **4th** | **13th** | Speed control of induction motor | **7th** | **PRACTICAL-4**  To plot relationship between no load terminal voltage and excitation current in a synchronous  generator at constant speed |
| **14th** | Harmonics and its effects, cogging and crawling in Induction Motors.Specifications and Ratings |
| **15th** | REVISION UNIT-1 | **8th** | **PRACTICAL-4**  To plot relationship between no load terminal voltage and excitation current in a synchronous  generator at constant speed |
| **16th** | REVISION UNIT-1 |
| **5th** | **17th** | REVISION UNIT-1 | **9th** | **PRACTICAL-5**  Determination of the relationship between the voltage and load current of an alternator,  keeping excitation and speed constant |
| **18th** | **Unit-2**  **(Single Phase motors)**  Motors Single phase induction motors; Construction characteristics and applications |
| **19th** | Nature of field produced in single phase induction motor | **10th** | **PRACTICAL-5**  Determination of the relationship between the voltage and load current of an alternator,  keeping excitation and speed constant |
| **20th** | Split phase induction motor  1 Capacitors start and run motor |
| **6th** | **21st** | 2 Shaded pole motor | **11th** | **PRACTICAL-6**  Determination of the regulation and efficiency of alternator from the open circuit and short  circuit test |
| **22nd** | 3 Reluctance start motor |
| **23rd** | Alternating current series motor and universal motors | **12th** | **PRACTICAL-6**  Determination of the regulation and efficiency of alternator from the open circuit and short  circuit test |
| **24th** | Single phase synchronous motor  1 Reluctance motor |
| **7th** | **25th** | 2 Hysteresis motor | **13th** | **PRACTICAL-7**  Determination of the effect of variation of excitation on performance of a synchronous motor |
| **26th** | REVISION UNIT-3 |
| **27th** | REVISION UNIT-3 | **14th** | **PRACTICAL-7**  Determination of the effect of variation of excitation on performance of a synchronous motor |
| **28th** | REVISION UNIT-3 |
| **8th** | **29th** | **Unit-3** **Synchronous Machines**  Main constructional features of synchronous machine including commutator and brushless excitation system | **15th** | REVISION PRACTICAL-1 |
| **30th** | Generation of three phase emf |
| **31st** | Production of rotating magnetic field in a three phase winding | **16th** | REVISION PRACTICAL-1 |
| **32nd** | Concept of distribution factor and coil span factor and emf equation  Armature reaction at unity, lag and lead power factor |
| **9th** | **33rd** | Operation of single synchronous machine independently supplying a load - Voltage  regulation by synchronous impedance method | **17th** | REVISION PRACTICAL-2 |
| **34th** | Need and necessary conditions of parallel operation of alternators  Synchronizing an alternator (Synchroscope method) with the bus bars |
| **35th** | Operation of synchronous machine as a motor –its starting methods | **18th** | REVISION PRACTICAL-2 |
| **36th** | Effect of change in excitation of a synchronous motor |
| **10th** | **37th** | Concept and Cause of hunting and its prevention  Concept and Cause of hunting and its prevention | **19th** | REVISION PRACTICAL-3 |
| **38th** | Rating and cooling of synchronous machines |
| **39th** | Applications of synchronous machines (as an alternator, as a synchronous condenser) | **20th** | REVISION PRACTICAL-3 |
| **40th** | REVISION UNIT-3 |
| **11th** | **41st** | REVISION UNIT-3 | **21st** | REVISION PRACTICAL-4 |
| **42nd** | REVISION UNIT-3 |
| **43rd** | **Unit-4**  **Special Purpose Machines** | **22nd** | REVISION PRACTICAL-4 |
| **44th** | Construction and working principle of linear induction motor |
| **12th** | **45th** | Construction and working principle of stepper motor, | **23th** | REVISION PRACTICAL-5 |
| **46th** | Construction and working principle of servomotor |
| **47th** | Construction and working principle of submersible motor | **24th** | REVISION PRACTICAL-5 |
| **48th** | REVISION UNIT-4 |
| **13th** | **49th** | REVISION UNIT-4 | **25th** | REVISION PRACTICAL-6 |
| **50th** | REVISION UNIT-4 |
| **51st** | REVISION UNIT-4 | **26th** | REVISION PRACTICAL-6 |
| **52nd** | REVISION UNIT-1 |
| **14th** | **53rd** | REVISION UNIT-1 | **27th** | REVISION PRACTICAL-7 |
| **54th** | REVISION UNIT-2 |
| **55th** | REVISION UNIT-2 | **28th** | REVISION PRACTICAL-7 |
| **56th** | REVISION UNIT-3 |
| **15th** | **57th** | REVISION UNIT-3 | **29th** | REVISION PRACTICALS |
| **58th** | REVISION UNIT-4 |
| **59th** | REVISION UNIT-4 | **30th** | REVISION PRACTICALS |
| **60th** | REVISION UNIT-4 |