

LESSON PLAN

SUB: AC MACHINES AND SPECIAL

ELECTRICAL MACHINES

BRANCH:- ELECTRICAL ENGG.

SEMESTER: 4th

SESSION: 2025-2026



NAME OF FACULTY: NIBEDITA HO



GOVERNMENT POLYTECHNIC, BHADRAK

Hod Electrical

HOD (ELECT.)
G.P. BHADRAK

Academic Co-ordinator

Academic Co-ordinator

Principal

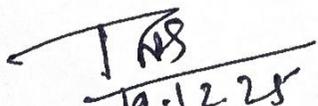
Govt. Polytechnic, Bhadrak

Principal
Govt. Polytechnic
Bhadrak

| Discipline: Electrical Engg. | Semester: 4 th | Name of the Teaching Faculty : Nibedita Ho (Lect. stage-II) Electrical Engg. |
|---|---|---|
| Subject: AC Machines and Special Electrical Machines | No. of Days/per week class allotted:3 | Semester from date: 22.12.2025 to 18.04.2026 No. of Weeks:15 |
| Week | Class Day | Theory |
| 1 st | 1 st | Three Phase Induction Motor: Production of rotating magnetic field, Synchronous speed |
| | 2 nd | Constructional feature of Squirrel cage and Slipring induction motors. |
| | 3 rd | Working principles of operation of 3-phase Induction motor. |
| 2 nd | 1 st | Define slip speed, slip and establish the relation of slip with rotor quantities. |
| | 2 nd | Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (numerical problems) |
| | 3 rd | Torque-slip characteristics, relation between full load torque and starting torque (numerical problems) |
| 3 rd | 1 st | Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (numerical problems) |
| | 2 nd | Induction motor as a generalized transformer with phasor diagram |
| | 3 rd | Four quadrant operation, power flow diagram (numerical) |
| 4 th | 1 st | Methods of starting and different types of starters used for three phase Induction motor. |
| | 2 nd | Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods. |
| | 3 rd | Maintenance of 3 phase induction motor |
| 5 th | 1 st | Single phase Induction Motors: Double revolving field theory, Ferrari's principle and Cross-field theory to analyze starting torque of 1-phase induction motor. |
| | 2 nd | Working principle, Torque speed characteristics, performance characteristics and application of Split phase motor |

| | | |
|------------------|-----------------|---|
| | 3 rd | Working principle, Torque speed characteristics, performance characteristics and application of Capacitor Start induction run motor. |
| 6 th | 1 st | Working principle, Torque speed characteristics, performance characteristics and application of Capacitor start, capacitor run motor. |
| | 2 nd | Working principle, Torque speed characteristics, performance characteristics and application of Shaded pole motor. |
| | 3 rd | Construction, working principle, running characteristic and application of Repulsion type motor. |
| 7 th | 1 st | Construction, working principle, running characteristic and application of single phase series motor. |
| | 2 nd | Construction, working principle and application of Universal motor. |
| | 3 rd | Construction, working principle and application of Hysteresis motor. |
| 8 th | 1 st | Motor selection for different applications as per the load torque-speed requirements and maintenance of 1phase induction motors. |
| | 2 nd | Three phase Alternators : Principle of working ,moving and stationary armatures |
| | 3 rd | Constructional details :parts and their functions Rotor constructions , Windings: Single and Double layer |
| 9 th | 1 st | E.M.F. equation of an Alternator with numerical by considering short pitch factor and distribution factor |
| | 2 nd | Alternator loading Factors affecting he terminal voltage of alternator |
| | 3 rd | Armature resistance and leakage reactance drops. |
| 10 th | 1 st | Armature reaction at various power factors and synchronous impedance |
| | 2 nd | Voltage regulation : direct loading and synchronous impedance methods |
| | 3 rd | Maintenance of alternators |

| | | |
|------------------|-----------------|--|
| 11 th | 1 st | Synchronous Motors: Principle of working /operation , significance of load angle. |
| | 2 nd | Torques : starting torque , running torque , pull in torque, pullout torque Synchronous motor on load with constant excitation (numerical), effect of excitation at constant load (numerical). |
| | 3 rd | Curves and Inverted V-Curves, Hunting and Phase swinging. |
| 12 th | 1 st | Methods of Starting of Synchronous Motor |
| | 2 nd | Methods of Starting of Synchronous Motor |
| | 3 rd | Losses in synchronous motors and efficiency (numerical). |
| 13 th | 1 st | Applications areas |
| | 2 nd | Fractional horsepower(FHP)Motors : Construction and working, Torque speed characteristics, Applications of Synchronous Reluctance Motor |
| | 3 rd | Construction and working, Torque speed characteristics, Applications of Switched Reluctance Motor |
| 14 th | 1 st | Construction and working, Torque speed characteristics, Applications of BLDC |
| | 2 nd | Construction and working, Torque speed characteristics, Applications of Permanent Magnet Synchronous Motors |
| | 3 rd | Construction and working, Torque speed characteristics, Applications of Stepper motors |
| 15 th | 1 st | Construction and working, Torque speed characteristics, Applications of AC servomotors |
| | 2 nd | Construction and working, Torque speed characteristics, Applications of AC servomotors |
| | 3 rd | Construction and working, Torque speed characteristics, Applications of DC servomotors |


 Signature of the faculty Concerned

Lect.in Elect.Engg.
 Govt.Poly.Bhadrak