

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4

Power Electronics

Subject Code 142401

Subject Name Electro Mechanical Energy Conversion-I

Sr.No	Course content
1.	D.C. Generator: Principle of D.C. generator and motor, construction, types of generators, E.M.F. equation, voltage build up process, critical resistance and speed, characteristics of generators, performance equation and efficiency, No load & load characteristics. Performance of shunt, series and compound generators.
2.	DC Motor : Type of motors, torque equation, characteristics, losses and efficiency, starters : Necessity of starter, Three point & four point starter. Introduction to soft starter. Torque-speed characteristics of shunt, series & compound motors, Speed control :, Basic concept of Static speed control of DC machines, Ward Leonard method. Losses & efficiency in D.C. machines by direct load test and Swinburne test.
3.	Three Phase Induction Motor: Introduction working principle, Classification of AC motors, Synchronous Speed, speed of rotor field, slip, Various methods of measurement of slip, starting & running torque, torque-slip characteristics, maximum torque, effect of change in voltage & frequency on torque, speed & slip
4.	Single Phase Transformer: Construction and principle of single-phase transformer, operation at no load and on load, vector diagram, equivalent circuit, losses, efficiency and regulation, determination of regulation and efficiency by direct load test and indirect test methods, parallel operation, auto transformer, condition for maximum efficiency, all day efficiency.
5.	Alternator: Basic concepts, Elementary Machines, 3-phase generators, generated emf., distribution & Pitch factor, voltage regulation by synchronous impedance and MMF method, Conditions of Parallel operation of synchronous generator.
6.	Special Machines: Commutator motors- 1 phase and 3 phase, Schrage motor, Stepper motor, AC servomotor, Induction regulator (1-phase and 3-phase), Induction generator, servomotor, repulsion motor, linear induction motor

Reference Books:

1. Elect. Technology Vol. II - B.L. Theraja
2. Electric machines by D.P.Kothari & I.J.Nagrath. (Tata Macgraw Hill)
3. Electric Machinery by P. S. Bhimra
4. Electrical Machines , Samarjit Ghosh, Pearson
5. Performance & design of ac machine –M.G.Say