# GUJARAT TECHNOLOGICAL UNIVERSITY

## B.E Semester: 3

## Electrical and Electronics Engineering

Subject Code 130904
Subject Name Electrical Machines-1

| Sr.No | Course content |
|---|---|
| 1. | D.C. Generator:<br>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 :<br>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 :<br>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:<br>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:<br>Basic concepts, Elementary Machines, 3-phase generators, generated emf,, distribution & Pitch factor, voltage regulation by synchronous impendence and MMF method, Conditions of Parallel operation of synchronous generator. |

## Reference Books:


1. Electrical Machines. By Nagarath & Kothari,TMH Publications
2. Electrical Technology Vol II. B. L. Theraja,S .Chand Publications
3. Performance and Design of A.C. machines by M. G. Say
4. Electrical Machines by P S Bhimbra
5. Electrical Machines by J. B. Gupta, Kataria Pub
6. Electrical Machines by Samarjit Singh – Pearson Education.