GUJARAT TECHNOLOGICAL UNIVERSITY

Power Electronics

M.E. Semester: II

Subject Name: **Special Machines (Major Elective –III)**

Sr. No.	Course Content
1.	**Reluctance Motor:** Types, Construction, operating performance, Type of converter and speed control, applications.
2.	**Brushless DC Motors:** Construction and working principle, Equivalent magnetic circuit, Type of converter and speed control, Comparison between the axial and radial permanent magnet motors, applications.
3.	**Stepper Motors:** Definition and types of stepper motors, Various modes of operation of Variable reluctance stepper motors, Micro stepping control of stepper motor, Multi stack VR stepper motor construction and working, Construction and working of Permanent Magnet stepper motor, Construction and working of Hybrid stepper motor, Torque-angle characteristics of the stepper motor.
4.	**Linear Induction Motors:** Construction, operation, performance, control and applications. Wind mill Generator: Comparison with synchronous generator , constant voltage & frequency generation, reactive power compensation.
5.	**Energy Efficient Motors:** Standard motor efficiency, concept of Energy efficient motor. Efficiency evaluation technique, Direct Measurement method, Loss, Segregation method, Comparison, motor efficiency labeling, Energy efficient motor standards. Motor life cycle, Direct Savings and pay back analysis, Efficiency evaluation factor.
6.	**Condition Monitoring of Electrical Machines:** Concept of condition monitoring, benefit of condition monitoring, Fault detection & diagnosis techniques for Transformer and Induction motor, Recent trends in condition monitoring.
7.	**Electrical Machine Analysis:** Introduction, magnetically coupled circuits, electromechanical energy conversion, machine windings and air-gap MMF-Winding inductances and voltage equations.

Reference Books:

1. "Brushless Permanent-Magnet Motor Design", Mcgraw Hill- D. C. Hanselman
2. Paul.C.Krause, " Analysis of Electric Machinery", McGraw-Hill, 1987.
3. "Electric Machinery", TMH Publication, 2002- A. E. Fitzerald, Charles Kingsley and Stephen D Umans
4. "Stepper Motors: Fundamentals, Applications and Design", New Age International Pvt. Ltd, 2002- V. V. Athani
5. "Alternating Current Machines" (ELBS publication) - M.G.Say