

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E.in Energy Engineering

Semester: I

Subject Name: **Energy Efficient Motors (Major Elective – I)**
(Electrical Group)

Subject Code: **713906**

Sr. No	Course Content
1.	Significance of Induction motor in Industries: Importance of 3-phase Induction motor in Industry. Industrial motor population and uses. Annual Electric motor sales volume. Comparison of Induction motor with other motors. Types of Enclosures and Protection used for three Phase motor. Zone wise classification of three phase motors.
2.	Basic concepts of 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, various power losses in three phase induction motor. Motor operation under abnormal conditions. Preventive maintenance of three phase motor.
3.	Energy Efficient Motors: Basic concepts of Energy Efficient motor. Motor losses and loss reduction techniques Energy efficient Stator design. Energy efficient Rotor design. Motor Efficiency test standards. Comparison between conventional and Energy Efficient motor. When to buy Energy Efficient Motor. Understanding utility rate schedule. Payback period and IRR for installing EEM. Motor purchase prices. Accessing Economic feasibility. Case studies. Utility of energy efficient motor and recommendations for motor purchaser.
4.	Soft Starters for three phase motors. Introduction to soft starter for three phase Induction motor. Comparison of soft starters with conventional starters used for three phase Induction motor. Comparison of characteristics of soft starter with other three phase motor starters.

Reference Books:

1. Electrical Machines. By Nagarath & Kothari, TMH Publications
2. Performance and Design of A.C. machines by M. G. Say, CBC Publication
3. Generalized theory of Electrical Machines by P S Bhimbra, Khanna publications
4. Electrical Machines by J. B. Gupta, Kataria Pub
5. Electrical Machines by Samarjit Singh, Pearson Education
6. Energy Efficiency in Electrical systems volume-II, IEEE Press
7. Energy Efficient motor selection handbook by Department of Energy United states of America.