

Introduction and review of electrical machines; Principles of electromagnetic energy conversion: General expression of stored magnetic energy, co-energy and force/torque, single and doubly excited system; Generalized theory of rotating electrical machine and Kron's primitive machine.

Introduction to reference frame theory, Application of reference frame theory to three phase symmetrical induction machines, modeling, steady state and transient analysis of induction machines, Unbalanced operation and fault analysis in three phase induction motors.

Basics of Electric Drives, stability of electric drives, four quadrant operations. Three phase induction motor, steady state operation with sinusoidal voltage, v/f control, vector control of Induction machine, space vector concepts, direct torque control, speed control of wound rotor induction machine, Static Scherbius and Kramer drive. Sensorless control of induction machines.

#### TEXT BOOKS/ REFERENCES:

1. P.C.Krause, "*Analysis of Electric Machines and Drive Systems*", Wiley International, 2002.
2. Jones C.V, "*The Unified Theory of Electrical Machines*", Butter Worth Publications, 1968.
3. A.E. Fitzgerald and Charles Kingsley, "*Electric Machinery*", McGraw Hill Book Company, 1986.
4. B. Adkins, "*Generalized Machine Theory*", McGraw Hill Book Company, 1964.
5. Bimbhra P S, "*Electrical Machinery*", Khanna Publishers, 1995.
6. Werner Leonhard, "*Control of Electrical Drives*", Third Edition, Springer International Edition, 2006.
7. Bimal K. Bose, "*Power Electronics and Variable Frequency Drives*", IEEE Press, 2002.
8. Krishnan R, "*Electric Motor Drives Modeling, Analysis and Control*", Prentice Hall of India, 2001.
9. Dr. Joseph Vithyathil, "*Power Electronics – Principles and Applications*", Tata McGraw Hill Education Pvt. Ltd., 2010.
10. Gopal K. Dubey, "*Fundamentals of Electric Drives*", Second Edition, Narosa Publishing House, 2001.