

(EE506) DYNAMICS OF ELECTRICAL MACHINES

Objective of the Course :

The subject helps the engineers to learn modern techniques and analytical methods for dealing with and solving operational problems in electrical machines. It also helps the students to develop and practice their research skills and find solutions to real problems.

UNIT - I

Operation And Steady State Behavior of Electrical Machines:

Electromechanical conversion – steady state equations of dc machines -rotating field theory – operation of induction motor – operation of synchronous motor – power angle characteristics.

UNIT - II

Electro dynamical equations and their solutions:

Lagrange's equation – Application of Lagrange's equation – solution of electro dynamical equations.

UNIT - III

Dynamics of DC Machines

Separately excited d.c. generators – steady state analysis – transient analysis – separately excited dc motors – steady state analysis – transient analysis interconnection of machines – Ward Leonard system of speed control

UNIT - IV

Induction Machine Dynamics

Induction machine dynamics during starting and braking – accelerating time – induction machine dynamics during normal operation – equation for dynamical response of the induction motor.

UNIT - V

Synchronous Machine Dynamics

Electromechanical equation – Motor operation – generator operation – small oscillations – general equations for small oscillations – representation of the oscillation equations in state variable form.

REFERENCE BOOKS:

1. Sen Gupta D.P. and J.W. Lynn "Electrical Machine Dynamics", Macmillan Press Ltd., 1980
2. Bimbhra P.S. "Generalized Theory of Electrical Machines", Khanna Publishers 2002.
3. P.C.Krause, O.Wasynczuk, "Electromechanical Motion Devices", Mc Graw Hill, 1989
4. C.Ong, "Dynamic Simulation of Electric Machinery Using MATLAB", Prentice Hall, 1998