

Department of Electrical & Electronic Engineering
Electrical Engineering Section
ELECTRICAL MACHINES III

EE 406

Year : FOURTH

Theory : 2 hr/Week
Tutorial : 1 hr/Week

Introduction to Generalised Machine Theory 10 Hrs.

Linear transformation in electrical circuits, choice of transformation, invariance of power, matrix equations of basic rotating machines, transformed impedance matrix, torque expressions, linear transformation in machines, application of the theory to AC & DC machines.

Single Phase Motors 18 Hrs.

Single phase IM, revolving field theory, equivalent circuit, performance calculation, starting methods, speed control, determination of parameters, braking. Single phase synchronous motors, applications.

AC Commutator Motors 8 Hrs.

Schrage motor, universal motor, Repulsion motor.

Introduction to Electrical Drives 2 Hrs.

Electrical drives, advantages, parts, choice of electrical drives, status of DC & AC drives.

Three Phase Induction Motor Drives 14 Hrs.

Review of 3-phase induction motors, operation with unbalanced source voltages & single phasing, unbalanced rotor impedances, IM with non-sinusoidal voltage supply, transient analysis. Speed control of 3-phase IM drives, effect of injected emf into secondary circuit, AC voltage controllers & soft start, variable frequency control from voltage and current sources. Eddy current drives, static rotor resistance control. Slip power recovery drive systems, variable speed constant frequency generation, closed loop control.

Synchronous Motor Drives 8 Hrs.

Review of cylindrical rotor & salient pole motors, operation from fixed frequency supply (starting, pull-in, transient due to load disturbances, braking), variable speed drives, variable frequency control of multiple synchronous motors, self controlled synchronous motor drives employing load commutation inverter & cycloconverter, starting of large synchronous machines.

Recommended Textbooks : 1) S.Dewan,G.Slemon & A.Straughen
Power Semiconductor Drives
John Wiley Pub.
2) A.Fitzgerald,C.Kingsley & A.Kusko
Electric Machinery
McGraw-Hill Pub.