# EE 518: MODELING & ANALYSIS OF ELECTRICAL MACHINERY (3-0-0: 3)

**Introduction**

Unified approach to the analysis of electrical machines - basic two-pole machine - Kron's primitive machine - voltage, power and torque equation - linear transformation from 3-phase to 2-phase - transformation from rotating axes to stationary axes - power invariance - park's transformation for 3-phase synchronous and induction machines.

**DC Machines**

Theory of Direct-current machines – elementary direct current machines – voltage and torque equations in machine variables – block diagram of Direct current machines, shunt machines, series machines and compound machines.

**Theory of Symmetrical Induction Machines**

Introduction – voltage equation in machine variables – Torque equation in machine variables – equation of transformation for rotor circuits – voltage equation in arbitrary reference – frame variables – Torque equation in arbitrary reference – commonly used reference frames per unit system.

**Polyphase Synchronous Machines**

Generalised machine equations – steady state analysis of salient pole and non salient pole machines – phasor diagrams – power angle characteristics – reactive power - short circuit ratio – transient analysis – sudden 3-phase short circuit at generator terminals – reactance – time constants – transient power angle characteristics.

**Text Books & References**


1. P S Bhimbra, "Generalised Theory of Electrical Machines", Khanna publishers.
2. Krauss, Wasyncsuk and Sudholf, "Analysis of Electrical Machines and Drives Systems", John Wiley.
3. K R Padiyar, "Power System Dynamics – Stability and Control", B S publications.
4. Fitzerald, Kingsley, Kusko, "Electric Machinery", McGraw Hill.
5. Paul C Krause, "Analysis of Electric Machinery", McGraw Hill.
6. R Krishnan, "Electric Motor Drives – Modelling, Analysis and Control", PHI Learning private Ltd.