EE801 AC MACHINE MODELLING AND FAULT DIAGNOSIS 3 0 0 3

UNIT1

Introduction to Principlesof Electric Machines:Faraday's Laws, Rotating Magnetic Field, Magneto-motive Force and Flux Distribution, Induced Voltage, Electromagnetic Torque. Construction and principles of operation of AC motors and generators.

UNIT2

Modelling of electrical machines: principles of generalised machine theory, rotating and stationary reference frames; 3-to-2 phase transformations; space vector method; application to Induction and synchronous machines, Modelling of Electric Machines Using Winding and Modified Winding Function Approaches and Magnetic Equivalent Circuit Method,Analysis of Faulty machines Using Finite Element Method, Dynamic modelling using MATLAB/SIMULINK.

UNIT3

Failure modes of electrical machines:Bearing Faults, Stator Faults, rotor faults, Eccentricity Fault. Techniques for fault diagnosis of machines:Frequency Domain techniques, Wavelet based techniques, model based techniques, Pattern recognition techniques GMM, SVM.

TEXT BOOKS/ REFERENCES:

1. S. J. Chapman, "Electric Machinery and Power Systems Fundamentals", McGraw-Hill,2002
2. Hamid A. Toliyat, Subhasis Nandi, Seungdeog Choi, HomayounMeshgin-Kelk, Electric Machines: Modeling, Condition Monitoring, and Fault Diagnosis CRC press, 2012
3. Peter J. Tavner, Li Ran, Jim Penman, Howard Sedding, Condition Monitoring of Rotating Electrical Machines, Institution of Engineering and Technology; 2nd Revised ed. Edition, 2008
4. Chee-Mun Ong, Dynamic Simulation of Electric Machinery: Using MATLAB/Simulink, Prentice Hall, 1998.
5. K. P. Soman, Loganathan, R., and Ajay, V., Machine Learning with SVM and other Kernel methods. PHI Learning Pvt. Ltd., 2009.
6. Bishop, Christopher M. Pattern Recognition and Machine Learning, Springer, 2006
7. Paul C. Krause, Olegasynczuk, and Scott D. Sudhoff,Analysis of Electric Machinery and Drive Systems, John Wiley & Sons,Second Edition,2002
8. Padiyar K.R., Power system dynamics: stability and control, BS Publications, Second Edition,2000.