MODELING OF POWER SYSTEM COMPONENTS
(ELECTIVE-I)

Course Code: 15EE2105

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Pre requisites: Electrical Machines and Power systems

Course Outcomes: At the end of the course, the student will be able to

CO1: Analyze synchronous machine dynamics.
CO2: Analyze and model of synchronous machine.
CO3: Analyze and model of Exciter and Turbine.
CO4: Analyze and model System Load.
CO5: Analyze Stability Studies.

UNIT-I (10-Lectures)
SYNCHRONOUS MACHINE ANALYSIS

Introduction, Representation of Synchronous Machine Dynamics, Stator and rotor winding voltage equations and flux linkages, Synchronous Machine Dynamics in Synchronous Reference Frame, Per Unit Representation-Stator and rotor winding voltage equations and flux linkage equations in per units.

UNIT-II (10-Lectures)
MODELING OF SYNCHRONOUS MACHINE

Sub transient and transient reactance, open circuit sub-transient and transient time constants, Effect of saturation on synchronous Machine Modeling, Estimation of Synchronous Machine Parameters through operational Impedance.

UNIT-III (10-Lectures)
MODELING OF EXCITER AND TURBINE

Exciter, IEEE Type DC1A, Model of Turbine- Hydro Turbine, Steam Turbine, Turbine governor.

UNIT-IV (10-Lectures)

MODELLING OF SYSTEM LOAD

Load Representation- Static load representation, Model of synchronous motor, Model of induction motor.

UNIT-V (10-Lectures)

MODELLING CORELATED TO STABILITY STUDIES

Steady State Condition, Multi-Machine System Representation, Special case of impedance loads, Sub-transient Model with Stator and Network Transients Neglected.

TEXT BOOKS:

1. Prabha Kundar, "Power System Stability and Control", Tata Mc-Graw Hill Publications, 1994.
2. K. R. Padiyar, "Power System Dynamics Stability and control", Second Edition, B. S. Publications, 2008.

REFERENCES:

1. P.M. Anderson, A.A. Fouad, "Power System Control and Stability", 2nd Edition, IOWA State University Press, Galgotia Publications, 2002.
2. M.A. Pai, "Power System Stability – Analysis by the direct method of Lyapunov", North Holland Publishing Company, Newyork, 1981.