

Subject Code: 1ET2130201	Subject Name: Power System Stability and Control
Pre-requisite Subject	Interconnected Power System

Course Objective: To study basics of power system stability, its effects and control action.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	5	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Power System Stability - Introduction Introduction, Basic Concept of Power system stability problem, Rotor angle stability, Concept of Voltage collapse, mid-term and long term stability, classification of stability, Review of Stability Problem	5	14 %
2	Small Signal Stability for Single Machine & Multi Machine System Small signal stability of single machine infinite bus system by means of Classical model, block diagram representation, effect of excitation system, effect of AVR and Damping torque component, Power System stabilizer, Small signal stability for multi machine system, Formulation of state Equation, representation of static load, Analysis of large system and AESOPS algorithms	10	28%
3	Torsional Characteristics & Sub Synchronous Oscillation Introduction, Turbine-generator torsional Characteristics, Shaft system Model Torsional interaction with Power System Control, Sub synchronous resonance, Characteristics of series capacitor, remedies to SSR Problems	5	14%
4	Voltage Collapse & Stability Basic concept of Voltage stability, Comparison of Angle and Voltage stability, Typical scenario of voltage collapse, Classification of voltage stability, Voltage stability analysis, Modelling requirements, Dynamic Analysis	10	28 %
5	Transient Stability Basic concept of transient stability, Simulation of dynamic system, structure of power system, excitation system representation, Analysis of unbalanced faults, Symmetrical components, sequence impedances, Simulation of different types of faults, Case study of transient stability of large machine system	6	16 %

Course Outcome:

After learning the course the students should be able to:

1. To acquire the knowledge regarding the different power system stabilities.
2. To acquire the knowledge of sub-synchronous resonance and its effect on power system.

List of Text Books:

1. P. S. Kundur - Power System Stability and Control, McGraw Hill Inc, New York.
2. K.R.Padiyar - Power System Dynamics - Stability and Control, BS Publishers, Hyderabad.

List of Reference Books:

1. J. Machowski, J.W.Bialek, J.R. Bumby - Power System Dynamics, Stability and Control, Wiley publishers.
2. P.Sauer and M.A.Pai - Power System Dynamics and Stability, Prentice Hall.
3. Ajarappa- The Techniques for Computation of Voltage Stability Assessment, Wiley IEEE Press.
4. I. J. Nagrath and D. P.Kothari - Modern Power Systems Analysis, Tata McGraw Hill.

List of Experiments:

1. Prepare a simulation to observe the voltage buildup of an unloaded synchronous generator with step excitation.
2. Prepare a simulation to observe the load angle variation of the synchronous machine connected to infinite bus with different disturbances.
3. Prepare a simulation of SMIB system and observe its transient response.
4. Prepare a state space model of a small power system and carry out small signal analysis.
5. Prepare a simulation of two machine system connected through a long transmission line.
6. Prepare a simulation of a multi-machine system and observe the dynamic response.
7. Prepare a simulation to show steady state voltage instability.
8. Prepare simulation of P-V and Q-V curves for given power system.