

Branch Name:	Electrical Engineering
ProgramCode:	ET213
CourseName:	Power System Stability and Control
CourseCode:	2ET2130201T
Pre-requisiteCourse:	Interconnected Power System

Course Objectives:

1. To understand the various power system stability problems.
2. To understand various types of stability.
3. To know various effects and advantages-disadvantages of stability in electrical power system.
4. To identify and analyze the control strategies for improving power system stability.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	SEE		CCA		SEE		CCA						
	L	T	P	Total	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
4	4	-	-	4	24	60	16	40	-	-	-	-	100

Course Contents:

Sr. No	Topic	Total Hours	Weightage (%)
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	08	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	12	21%
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	06	10%
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	12	20%
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	10	20%

6	Excitation and Prime Mover Controllers Excitation System, Excitation System Modelling, Excitation Systems-Standard Block Diagram, System Representation by State Equations, Prime-Mover Control System, Examples.	08	15%
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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.

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.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the basic types of power system stabilities.	2 Understanding
CLO2	Analyze and design various methods for determine the power system stability .	4Analyze 6 Creating
CLO3	acquire the knowledge of sub-synchronous resonance and its effect on power system.	2 Understanding
CLO4	Understand the torsional characteristics & sub synchronous oscillation.	2 Understanding
CLO5	Analyze and evaluate the voltage stability and reason for voltage collapse.	4Analyze 5 Evaluate
CLO6	Analyze and evaluate the transient stability, symmetrical component and different fault in system.	4Analyze 5 Evaluate

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	L			M			L				M		M			L
CLO2			L		M			M		L		M		M	H	
CLO3		L		M			L				M		M			L
CLO4				M			L				M		M			L
CLO5			L		M			M		L		M		M	H	
CLO6			L		M			M		L		M		M	H	

H: High, M: Medium, L: Low

