VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA

LESSON PLAN

Semester: 2nd **Subject: FACTSFACTS MODELING CONTROL & APLLICATION**

Section: PSE & PECD **Theory / Sessionals: Theory**

Branch/Course: Electrical Engineering / M. Tech. **Name of the Faculty Member: Dr. R .K. Sahu**

Period	Module / Number	Topic to be covered	Remarks /Sign. of Faculty Member
1	Mod. I / 1	Introduction to FACTS concepts and general system considerations	
2	Mod. I / 2	Power flow in AC system, transient stability and dynamic stability, Basic description of FACTS controllers	
3	Mod. I / 3	Brief review of voltage sourced converter and current sourced converter, modeling philosophy	
4	Mod. I / 4	Introduction to Static var compensator (SVC and STATCOM), Operating principles	
5	Mod. I / 5	Objectives of shunt compensation, methods of controllable Var Generation, Regulation slope, transfer function	
6	Mod. I / 6	V-I and V-Q characteristics of SVC and STATCOM	
7	Mod. I / 7	Transient stability enhancement, var reserve control,	
8	Mod. I / 8	Modeling: conventional power flow models, shunt variable susceptance model, firing angle model, transient stability model	
9	Mod. I / 9	Voltage magnitude control using SVC & STACOM	
10	Mod. I / 10	Application example	
11	Mod. II / 1	Introduction to Static Series compensators (TCSC and SSSC), Operating principles	
12	Mod. II / 2	Objectives of series compensation: improvements of voltage and transient stability	
13	Mod. II / 3	Power oscillation damping, sub-synchronous damping by Series FACTS	
14	Mod. II / 4	Transmittable power and transmittable angle characteristics	
15	Mod. II / 5	Control range, conventional power flow models	
16	Mod. II / 6	Variable series impedance model, firing angle model, transient stability model	
17	Mod. II / 7	Active power flow control using TCSC & SSSC	
18	Mod. II / 8	Application example	
19	Mod. II / 9	TCSC Based Controller Design	
20	Mod. II / 10	SSSC Based Controller Design	
21	Mod. III / 1	Introduction to Static voltage and phase angle regulator (TCVR and TCPAR)	
22	Mod. III / 2	Objectives of voltage and phase angle regulators	
23	Mod. III / 3	Approaches to TCVR and TCPAR	

24	Mod. III / 4	Switching converter based voltage and phase angle regulators	
25	Mod. III / 5	Introduction to Unified power flow controller	
26	Mod. III / 6	Basic operating principle of UPFC, Transmission control by UPFC	
27	Mod. III / 7	Independent real and reactive power flow control with UPFC	
28	Mod. III / 8	Power flow and transient stability models of UPFC	
29	Mod. III / 9	Control structure and basic control system for P and Q control	
30	Mod. III / 10	Dynamic performance of UPFC	
31	Mod. III / 11	Application example of UPFC	
32	Mod. IV / 1	Introduction to control studies with FACTS devices	
33	Mod. IV / 2	Steady state analysis with SVC and STATCOM	
34	Mod. IV / 3	Power oscillation stability analysis and control with SVC and STATCOM	
35	Mod. IV / 4	Transient stability control with SVC and STATCOM	
36	Mod. IV / 5	Steady state analysis with TCSC and SSSC	
37	Mod. IV / 6	Power oscillation stability analysis and control with TCSC and SSSC	
38	Mod. IV / 7	Transient stability control with TCSC and SSSC	
39	Mod. IV / 8	Steady state analysis with UPFC	
40	Mod. IV / 9	Power oscillation stability analysis and control with UPFC	
41	Mod. IV / 10	Transient stability control with UPFC	

Signature of the Faculty Member:

Date: **Counter Signature of H.O.D.**