SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
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Seetharampuram, NARSAPUR-534 280, W.G-Dist., Andhra Pradesh

Department of Electrical & Electronics Engineering

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods/ Week	Academic Year	Date of Commencement of Semester
20EE7E03	FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS	VII	EEE	6	2025-26	09-06-2025

Course Outcomes: *After successful completion of this course, students should be able to:*

1	Know the concepts of facts controller and power flow control in transmission line.
2	Demonstrate operation and control of voltage source converter and know the concepts current source converter
3	Analyze compensation by using different compensators to improve stability and reduce power oscillations in the transmission lines.
4	Know the concepts methods of compensations using series compensators.
5	Analyze operation of Unified Power Flow Controller and Interline power flow controller

Unit	Outcome/Bloom's Level	Topics No.	Topics/ Activity	Text Book/ Reference	Contact Hour	Delivery Method
I	Know the concepts of facts controller and power flow control in transmission line.	1.1	Overview of FACTS	T1,R1	1	Chalk and Board
		1.2	**UNIT-I : Introduction to FACTS** Power flow in an AC system	T1,R1	1	Chalk and Board, PPT
		1.3	Loading capability limits	T1,R1	1	Chalk and Board, PPT
		1.4	Dynamic stability considerations	T1,R1	1	Chalk and Board, PPT
		1.5	Importance of controllable parameters	T1,R1	2	Chalk and Board, PPT
		1.6	Basic types of FACTS controllers	T1,R1	2	Chalk and Board, PPT
		1.7	Benefits from FACTS controllers	T1,R1	2	Chalk and Board, PPT
		1.8	Requirements of FACTS Devices	T1,R1	1	Chalk and Board, PPT
		1.9	characteristics of high power devices	T1,R1	1	Chalk and Board, PPT
				Total	12	
II	Demonstrate operation	2.1	**UNIT-II : Voltage source**	T1, R1	1	Chalk and

	and control of voltage source converter and know the concepts current source converter		**and Current source converters** Voltage source converter (VSC)			Board
		2.2	Single phase full-wave bridge converter	T1, R1	1	Chalk and Board
		2.3	Square wave voltage harmonics for a single–phase bridge converter – Three–phase full-wave bridge converter	T1, R1	2	Chalk and Board
		2.4	Transformer connections for 12 pulse operation.	T1, R1	2	Chalk and Board
		2.5	Current Source Converter (CSC)-Three–phase current source converter	T1, R1	1	Chalk and Board, PPT
		2.6	Comparison of current source converter with voltage source converter	T1, R1	1	Chalk and Board, PPT
				Total	08	
III	Classify between classical and fuzzy sets	3.1	**UNIT-III : Shunt Compensators And Variable Impedance Type VAR Generator Shunt Compensators** Objectives – Mid–point voltage regulation for line segmentation	T1,R1	1	Chalk and Board
		3.2	End of line voltage support to prevent voltage instability	T1,R1	2	Chalk and Board
		3.3	Improvement of transient stability	T1,R1	1	Chalk and Board
		3.4	Power oscillation damping.	T1,R1	1	Chalk and Board
		3.5	**Variable Impedance Type VAR Generator** Thyristor Switched/Controlled Reactor (TSR/TCR)	T1,R1	2	Chalk and Board
		3.6	Thyristor Switched Capacitor (TSC)	T1,R1	1	Chalk and Board
		3.7	Fixed Capacitor– Thyristor Controlled Reactor (FC-TCR)	T1,R1	1	Chalk and Board
		3.8	Thyristor Switched Capacitor and Thyristor Controlled Reactor (TSC–TCR) -	T1,R1	2	Chalk and Board

		3.9	Switching Converter type VAR generator, Principle of operation and comparison of SVC and STATCOM	T1,R1	2	Problem Solving
				Total Classes	13	
IV	Know the concepts methods of compensations using series compensators.	4.1	**UNIT-IV : Series Compensators** Concept of series capacitive compensation	T1,R1	1	Chalk and Board
		4.2	Improvement of transient stability	T1,R1	1	Chalk and Board
		4.3	Power oscillation damping – Functional requirements.	T1,R1	2	Chalk and Board
		4.4	Variable Impedance type series compensators – GTO Thyristor controlled Series Capacitor (GSC)	T1,R1	2	Chalk and Board
		4.5	Thyristor Switched Series Capacitor (TSSC) and Thyristor Controlled Series Capacitor (TCSC)	T1,R1	1	Chalk and Board
		4.6	Switching Converter type Series Compensation – Static Synchronous Series Compensator	T1,R1	1	Chalk and Board
				Total	08	
V	Analyze operation of Unified Power Flow Controller and Interline power flow controller	5.1	**UNIT-V : Combined Compensators** Schematic and basic operating principles of unified power flow controller (UPFC)	T1,R1	1	Chalk and Board
		5.2	Schematic and basic operating principles of Interline power flow controller (IPFC) –	T1,R1	1	Chalk and Board
		5.3	Controller applications of transmission lines.	T1,R1	1	Chalk and Board
		5.4	Revision	T1,R1	1	Chalk and Board
		5.5	Discussion on 5 units	T1,R1	1	Chalk and Board
				Total Classes	05	
				Overall Classes	46	

Text Books:

S. No.	Authors, Book Title, Edition, Publisher, Year of Publication
1	N.G.Hingorani and L.Guygi, "Understanding FACTS" IEEE Press.Indian Edition Standard Publications, 2001.
2	Sang.Y.H and John.A.T, "Flexible AC Transmission systems" IEEE Press 2006
3	Vijay K.Sood , "HVDC & FACTS Controllers: applications of static converters in power systems" Springer publishers

Reference Books:

S. No	Authors, Book Title, Edition, Publisher, Year of Publication
1	"Flexible ac transmission system (FACTS)" Edited by Yong Hue Song and Allan T Johns, Institution of Electrical Engineers, London.
2	Mohan Mathur and Rajiv K.Varma, "Thyristor-based FACTS Controllers for Electrical Transmission Systems" by RWiley.

		Name	Signature
i.	Course Coordinator	Mrs.N.Lavanya	
ii.	Module Coordinator	Dr V Madhu	
iii.	Programme Coordinator	Dr A Satyanarayana	

Principal