FLEXIBLE AC TRANSMISSION SYSTEMS (ELECTIVE-II)

Course Code:13EE2215 **L P C**
4 0 3

Pre requisites: Power Electronics and Power Systems

Course Outcomes: After completion of the course, the student will be able to

CO1: Describe the types of FACTS devices and their Operations.
CO2: Analyze the 2 level and 3 level VSC and Compare VSC and CSC.
CO3: Describe the various Shunt devices, their operation and control.
CO4: Analyze the various technical parameters of SVC and STATCOM.
CO5: Describe the various Series devices, their operation and control

UNIT-I

FACTS CONCEPTS: Transmission interconnections power flow in an AC system, loading capability limits, Dynamic stability considerations, importance of controllable parameters, basic types of FACTS controllers, benefits from FACTS controllers.

UNIT-II

VOLTAGE SOURCE CONVERTERS: Single Phase Three Phase Full Wave Bridge Converter Transformer Connections for 12 Pulse 24 And 48 Pulse Operation. Three Level Voltage Source Converter, Pulse Width Modulation Converter, Basic Concept of Current Source Converters, and Comparison of Current Source Converters With Voltage Source Converters

UNIT-III

STATIC SHUNT COMPENSATION: Objectives of Shunt Compensation, Midpoint Voltage Regulation Voltage Instability Prevention, Improvement of Transient Stability, Power Oscillation Damping, Methods of controllable VAR Generation, Variable Impedance Type Static VAR Generators Switching Converter Type VAR Generators Hybrid VAR Generators.

UNIT-IV

SVC AND STATCOM: The Regulation and Slope Transfer Function, Dynamic Performance, Transient Stability Enhancement And Power Oscillation Damping ,Operating Point Control and Summary Of Compensator Control.

UNIT-V

STATIC SERIES COMPENSATORS: Concept of Series Capacitive Compensation, Improvement of Transient Stability, Power Oscillation Damping, Subsynchronous Oscillation Damping. Functional Requirements of GTO Thyristor Controlled Series Capacitor(GCSC), Thyristor Switched Series Capacitor(TSSC), And Thyristor Controlled Series Capacitor(TCSC) Control Schemes for GCSC TSSC and TCSC

TEXT BOOK:

1. N.G. Hingorani and L. Gyugui "*Understanding FACTS Concepts and Technology of Flexible AC Transmission Systems*", B.S. Publications, Indian Reprint 2000

REFERENCE BOOKS

1. R.MohanMathur, Rajiv K Varma, "*Thyristor based FACTS Controller for Electrical Power Systems*" , John Wiley Sons,2011.

2. X.P.Zhang, C.Rehtanz, B.Pal "*Flexible AC Transmission System Modelling and Control*" Springer,2006