EE 412 HVDC & FACTS (3-0-0:3)

DC Power Transmission Technology:
Introduction-comparison of AC and DC transmission-application of DC transmission description of DC transmission system-planning for HVDC transmission-modern trends in DC transmission, Different configuration of HVDC scheme.

Analysis of HVDC Converters:
Pulse number-choice of converter configuration-simplified analysis of Graetz circuit converter bridge characteristics – characteristics of a twelve pulse converter, Different faults occurred in converter, Protection against overvoltage, over current.

HVDC System Control:
General principles of DC link control-converter control characteristics –system control hierarchy – firing angle control-current and extinction angle control-starting and stopping of DC link – power control-higher level controllers – telecommunication requirements. Harmonics and Filters: Introduction-generation of harmonics-design of AC filters-DC filters-carrier frequency and RI noise

Introduction to FACTS:
Basic concepts of reactive power compensation, Types of compensation, Static VAR compensators, Resonance damper, Thyristor controlled series capacitor (TCSC), Static condenser, Phase angle regulator, and other controllers.

Series Compensation Technique:
Sub-Synchronous resonance, Tensional interaction, Modeling and control of Thyristorised controlled series compensators. Static VAR Compensation - Basic concepts, Thyristor controlled reactor (TCR), Thyristors switched reactor (TSR), Thyristor switched capacitor (TSC), saturated reactor (SR), and fixed capacitor (FC)

Facts Controllers & STATCOM:
Variable structure FACTS controllers for Power system transient stability, Non-linear variablestructure control, Unified power flow, Unified Power Flow Control - Introduction, Implementation of power flow control using conventional thyristors, concept, Implementation of unified power flow controller. Basics of STATCOM, its applications.

Text Books:

1. K.R.Padiyar, “HVDC Power transmission system”, Wiley Eastern Limited
2. Barain G. Hingorani, “Understanding Facts”, IEEE Press, New York

References:

1. S. Kamakshaiah & V. Kamaraju, “HVDC Transmission”, Tata McGraw hill education
2. Yong Hua Sung and Allan T. John (ed), “Flexible AC Transmission System (FACTS)”, The Institution of Electrical Engineering, London
3. Kimbark E.X., “Direct Current Transmission”, Wiley Interscience, New York
4. A. Chakraborty, D.P. Kothary, A.K. Mukhopadhyay, “The Performance, Operation and Control of EHV Power Transmission Systems”, Wheeler Pub.