

UNIT - 1 General considerations, Power Handling Capabilities of HVDC Lines, Basic Conversion principles, static converter configuration. Static Power Converters : 3-pulse, 6-pulse and 12-pulse converters, converter station and Terminal equipment, commutation process, Rectifier and inverter operation, equivalent circuit for converter – special features of converter-transformers

UNIT - 2 Control of HVDC Converters and systems: constant current, constant extinction angle and constant Ignition angle control. Individual phase control and equidistant firing angle control, DC power flow control.

UNIT - 3 Harmonics in HVDC Systems, Harmonic elimination, AC and DC filters. Interaction between HV AC and DC systems – Voltage interaction, Harmonic instability problems and DC power modulation.

UNIT – 4 Multi-terminal DC links and systems; series, parallel and series parallel systems, their operation and control.

UNIT - 5 Transient over voltages in HVDC systems : Over voltages due to disturbances on DC side, over voltages due to DC and AC side line faults Converter faults and protection in HVDC Systems: Converter faults, over current protection - valve group, and DC line protection. Over voltage protection of converters, surge arresters.

Text Books :

1. E.W. Kimbark, "Direct current Transmission", Wiley Inter Science, New York.
2. J.Arillaga, "H.V.D.C.Transmission", Peter Peregrinus ltd., London UK 1983
3. K.R.Padiyar, "High Voltage Direct current Transmission", Wiley Eastern Ltd., New Delhi, 1992.
4. E.Uhlman, "Power Transmission by Direct Current", Springer Verlag, Berlin Helberg, 1985