

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

IV Year II Sem

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(58008) H.V.D.C. TRANSMISSION**Objective:**

This subject deals with the importance of HVDC transmission, analysis of HVDC converters, Faults and protections, Harmonics and Filters. It also deals with Reactive power control and Power factor improvements of the system.

UNIT – I BASIC CONCEPTS

Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC & DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission.

UNIT – II ANALYSIS OF HVDC CONVERTERS

Choice of Converter configuration – analysis of Graetz – characteristics of 6 Pulse & 12 Pulse converters – Cases of two 3 phase converters in star – star mode – their performance.

UNIT – III CONVERTER & HVDC SYSTEM CONTROL

Principal of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system; Starting and stopping of DC link; Power Control.

UNIT-IV REACTIVE POWER CONTROL IN HVDC

Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies-sources of reactive power-AC Filters – shunt capacitors-synchronous condensers.

UNIT –V POWER FLOW ANALYSIS IN AC/DC SYSTEMS

Modelling of DC Links-DC Network-DC Converter-Controller Equations-Solution of DC loadflow – P.U. System for d.c. quantities-solution of AC-DC Power flow-Simultaneous method-Sequential method.

UNIT-VI CONVERTER FAULT & PROTECTION

Converter faults – protection against over current and over voltage in converter station – surge arresters – smoothing reactors – DC breakers –Audible noise-space charge field-corona effects on DC lines-Radio interference.

UNIT – VII HARMONICS

Generation of Harmonics –Characteristics harmonics,calculation of AC Harmonics,Non-Characteristics harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics

UNIT-VIII FILTERS

Types of AC filters,Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar, New Age International (P) Limited, and Publishers.
2. EHVAC and HVDC Transmission Engineering and Practice – S.Rao.

REFERENCE BOOKS:

1. HVDC Transmission – J.Arrillaga.
2. Direct Current Transmission – by E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications.