

EE8017 HIGH VOLTAGE DIRECT CURRENT TRANSMISSION

DETAILED SYLLABUS

OBJECTIVES:

To impart knowledge about the following topics:

- Planning of DC power transmission and comparison with AC power transmission.
- HVDC converters.
- HVDC system control.
- Harmonics and design of filters.
- Power flow in HVDC system under steady state.

UNIT I INTRODUCTION

DC Power transmission technology–Comparison of AC and DC transmission–Application of DC transmission–Description of DC transmission system–Planning for HVDC transmission–Modern trends in HVDC technology–DC breakers–Operating problems– HVDC transmission based on VSC –Types and applications of MTDC systems.

UNIT II ANALYSIS OF HVDC CONVERTERS

Line commutated converter -Analysis of Graetz circuit with and without overlap -Pulse number– Choice of converter configuration – Converter bridge characteristics– Analysis of 12 pulse converters– Analysis of VSC topologies and firing schemes.

UNIT III CONVERTER AND HVDC SYSTEM CONTROL

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 –Control of VSC based HVDC link.

UNIT IV REACTIVE POWER AND HARMONICS CONTROL

Reactive power requirements in steady state–Sources of reactive power–SVC and STATCOM– Generation of harmonics –Design of AC and DC filters– Active filters.

UNIT V POWER FLOW ANALYSIS IN AC/DC SYSTEMS

Per unit system for DC quantities–DC system model –Inclusion of constraints –Power flow analysis –case study

TEXT BOOKS:

1. Padiyar, K.R., “HVDC power transmission system”, New Age International(P)Ltd. NewDelhi, Second Edition,2010.
2. Arrillaga, J., “High Voltage Direct Current Transmission”, Peter Pregrinus, London,1983.

REFERENCES

1. Kundur P., “Power System Stability and Control”, McGraw-Hill,1993.

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Notes
Syllabus
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www.AllAbtEngg.com

2. Colin Adamson and Hingorani NG, "High Voltage Direct Current Power Transmission", Garraway Limited, London, 1960.
3. Edward Wilson Kimbark, "Direct Current Transmission", Vol.I, Wiley inter science, New York, London, Sydney, 1971.