

HVDC Power Transmission

Overview

In early invention of electric energy, dc power was used but due to limitations of low voltage dc systems, ac systems become popular. With increase interconnection and loading of power system, the factors such as are reactive power, stability, power control, etc, impose limitations on the amount of power to be transmitted over ac lines. With advent of high voltage semiconductor devices, it has been possible to go for high voltage dc (HVDC) transmission for long distance power transfer.

Semiconductor technology enabled the manufacture of powerful thyristors and later of new elements such as the gate turn-off thyristors (GTO) and gate bipolar transistors (IGBT). Development based on the semiconductor devices first established high voltage DC transmission (HVDC) technology as an alternative to long distance ac transmission.

There are still several limitations of HVDC transmission. Therefore, the transmission system is mixed of HVAC and HVDC systems. This course will provide in-depth knowledge of HVDC system, converter topology, control of HVDC system, filters, analysis of HVDC/HVAC systems, etc.

The primary objectives of the course are as follows:

- i. Exposing participants to the fundamentals of HVDC,
- ii. To study the importance of HVDC Transmission and HVDC Converters
- iii. The power conversion between Ac to DC and DC to AC.
- iv. To deal with firing angle of HVDC System
- v. To deal with Reactive power control of HVDC system
- vi. To deal with Power factor improvement of HVDC system
- vii. To deal with the protection of HVDC system

Course participants will learn these topics through lectures. Also case studies and assignments will be shared to stimulate research motivation of participants.

Modules	A: Introduction to HVDC : Feb. 20 - Feb. 22 B: Reactive Power & Voltage Control : Feb. 23 - Oct. 27 C: Harmonic generation, effects and filtering : Feb. 28 - March 03 D: HVDC Converter Operation & Control : Mar. 06 - Mar. 08
You Should Attend If...	<p>Number of participants for the course will be limited to fifty.</p> <ul style="list-style-type: none"> ▪ You are an electrical power engineer or research scientist interested in designing HVDC systems for power transmission at component level. ▪ You are a working engineer in power utilities and interested to learn HVDC power transmission systems, its sub-systems, working of every components and state-of-the-art from an R&D engineer in details. ▪ You are a student or faculty from academic institution interested in learning research challenges, state-of-art, design and working of a HVDC power transmission systems, its sub-systems, working of every components and state-of-the-art from an R&D engineer in details.
Fees	<p>The participation fees for taking the course is as follows:</p> <p>Participants from abroad : US \$400 Industry/ Research Organizations: 20000 Academic Institutions: 10000</p> <p>The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation/meals on payment basis.</p>

The Faculty



Prof. K. N. Srivastava is Senior Research and Development Engineer at Global Research Lab , ABB, Sweden. His research interests include power system dynamics, control, hvdc, optimization techniques, modelling and simulation of power systems. *He has been working for ABB Sweden for last 19 years.* He is also adjunct professor at Lulea Technical University and IIT Kanpur.



Dr. Bharat Singh Rajpurohit is working as Associate Professor in the School of Computing and Electrical Engineering at Indian Institute of Technology Mandi, India. His research interests include power electronics and grid integration of renewable energy sources.

Course Co-ordinator

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