PEE322 HVAC AND HVDC TRANSMISSION SYSTEMS

L	T	P	Cr
3	1	0	3.5

Course Objectives: To know modern transmission systems using HVDC and HVAC, to understand study static VAr system, corona and radio & TV interference and to learn design filters for harmonics reduction.

Overview: Comparison of EHVAC and HVDC transmission, Description of DC transmission systems, Modern trends in AC and DC transmission.

HVAC System: Limitations of extra long AC transmission, Voltage profile and voltage gradient of conductor, Electrostatic field of transmission line, Reactive Power planning and control, Traveling and standing waves, EHV cable transmission system.

Static VAr System: Reactive VAr requirements, Static VAr systems, SVC in power systems, Design concepts and analysis for system dynamic performance, Voltage support, Damping and reactive support.

HVDC System: Converter configurations and their characteristics, DC link control, Converter control characteristics, Monopolar operation, Converter with and without overlap, Smoothing reactors, Transients in DC line, Converter faults and protection, HVDC breakers.

Corona and Interference: Corona and corona loss due to HVAC and HVDC, Radio and TV interference due to HVAC and HVDC systems, Methods to reduce noise, Radio and TV interference.

Harmonic Filters: Generation of harmonics, Design of AC filters, DC filters.

Power Flow Analysis in AC/DC Systems: Modelling, Solution of DC load flow, Solution techniques of AC/DC power flow equations, Parallel operation of HVDC/AC systems, Multi terminal systems.

Course Learning Outcome: On the completion of the course, the student will be able

- To learn HVAC and HVDC transmission systems.
- To analyse system dynamic performance and reactive power requirements.
- To know about corona and radio & TV interference.
- To design filters for reduction of harmonics.
- To solve power flow equations.

Recommended Books

1. *Arrillaga, J., HVDC Transmission, IEE Press (2007).*
2. *Arrillaga, J. and Smith, B.C., AC to DC Power System Analysis, IEE Press (2008).*
3. *Begamudre, R..D., EHVAC Transmission Engineering, New Age International (P) Limited, Publishers (2006).*
4. *Edwart, K., Direct Current Transmission (Vol. 1), John Wiley and Sons (2008).*
5. *Padiyar, K.R., HVDC Power Transmission Systems, New Age International (P) Limited, Publishers (2008).*

Evaluation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1.	MST	30
2.	EST	45
3.	Sessionals (May include Assignments/Projects/Tutorials/Quizes etc.)	25