Advanced Power Transmission Technologies Course

Venue Information

Venue: London UK

Place:

Start Date: 2026-12-22

End Date: 2026-12-26

Course Details

Net Fee: £4750.00

Duration: 1 Week

Category ID: EAPET

Course Code: EAPET-44

Syllabus

Course Description

The world's electric power supply systems are interconnected across regional, inter-regional, and international connections. The purpose of this complex integration is to lower operating costs while enhancing the reliability and security of supply.

Today, the Electrical Supply Industry is undergoing a major transformation. Rising economic pressures, evolving consumer demands, and the increasing adoption of renewable energy sources are creating new challenges. The industry must now deliver higher quality and secure supply while meeting environmental standards such as those emphasized at the Kyoto Summit, all within a decentralized global electricity market.

Power Electronics Control of Deregulated Power Systems will play a vital role in this future. Managing the integration of new-generation power electronic systems worldwide will significantly impact all sectors, including:

- Utilization
- Equipment Manufacturing

Course Objective

- Introduce the fundamental concepts of transmission network compensation.
- Discuss modern power electronics equipment available to transmission engineers for network optimization.
- Familiarize participants with the latest transmission system developments.
- Provide practical principles that can be applied to real-world operational challenges using advanced equipment and methods covered in the seminar.

Course Outline

Day One

- Introductions and discussion of seminar goals.
- Overview of power systems and new operational challenges.
- Transmission interconnections and their importance.
- Opportunities for FACTS in transmission networks.
- Review of AC system power flow, parallel paths, and meshed systems.
- Loading limitations and stability considerations.
- Introduction to FACTS: shunt, series, and combined connections.
- Introduction to HVDC technology and comparison with FACTS.

Day Two

- Overview of power semiconductor devices:
    - Diode, Thyristor, GTO, MTO, IGCT, IGBT, MCT
    - Voltage-source converters: single-phase, square-wave, and harmonics
    - Three-phase bridge, 12-pulse, 24/48-pulse systems
    - Multilevel and PWM systems
    - Current-source converters: line commutated and forced commutated
    - Comparison of voltage-source vs current-source systems

Day Three

- Shunt compensation and voltage regulation objectives.
- Methods of controllable VAr generation.
- Static VAr generators and converters.

- Comparison of shunt and series compensation performance.

Day Four

- Dynamic Voltage Restorer (DVR).
- Combined compensators: Unified Power Flow Controller (UPFC) and Interline Power Flow Controller (IPFC).
- Operating principles and control capabilities.
- Independent real and reactive power flow control.
- Comparison of combined vs separate controllers.

Day Five

- Applications and case studies of FACTS controllers.
- Modern HVDC systems using VSC and PWM concepts.
- Global applications and existing installations.
- Industry standards and best practices.
- Deregulated power systems: opportunities, requirements, and operational strategies.
- Enhancing stability and ROI with advanced transmission technologies.
- Equipment selection examples and case-based studies.