Modern Electric Power Systems Design, Modelling, Analysis and Problem Solving Course

Venue Information

Venue: London UK

Place:

Start Date: 2026-02-24

End Date: 2026-02-28

Course Details

Net Fee: £4750.00

Duration: 1 Week

Category ID: EAPET

Course Code: EAPET-39

Syllabus

Course Description

In today's industrial landscape, a dependable supply of electrical energy is crucial for efficiency and productivity. A well-structured power system not only enhances plant performance but also ensures reliable operation of processes and services. With increasing reliance on electricity, automation, and advanced technologies, modern power systems must be designed, planned, and maintained using the most effective methods available.

Course Objective

By the end of this training, participants will develop a strong understanding of:

- How power flows in both small and large networks, and strategies to deliver more real power efficiently to load centers.

- Integration of alternative and embedded generation, including insights into carbon emissions trading.
- Techniques for diagnostic monitoring of power plants, especially GIS substations.
- Applications of modern power electronics in HVDC transmission.
- Use of high-speed fault limiters and real-time stability monitors.
- Principles of demand side management and its impact on energy efficiency.

Course Outline

System Planning

- Essential design considerations
- Guidelines for industrial plant design
- Voltage requirements and analysis
- Fundamentals of power system analysis

Power System Analysis

- Voltage, current, and power in balanced three-phase systems
- Per unit system fundamentals
- Electrical machine parameters
- Two- and three-winding transformer models
- Load models and system behavior
- Transmission line and cable characteristics

Short Circuit Studies

- Purpose and importance of short circuit studies
- Sources and representation of short circuit currents
- Core concepts of fault analysis
- Symmetrical components and sequence networks
- Fault types and their impact
- ANSI/IEC calculation methods
- Circuit breaker duty evaluation
- Practical steps to perform and interpret studies

Power Flow Studies

- Data requirements and problem formulation
- Methods for solving power flow equations

- Voltage collapse mitigation
- Power factor correction strategies

Motor Starting Studies

- Objectives and necessity of motor starting studies
- Modeling of induction and synchronous motors
- Static vs dynamic motor starting analysis
- Mitigating voltage issues during motor starting
- Types of motor starting devices

Power Factor and Related Considerations

- Reactive power fundamentals
- Capacitor unit and bank ratings
- Capacitor protection and switching
- Motor terminal applications
- Switched capacitor control
- Harmonics and resonance issues

Grounding

- Equipment grounding principles
- System grounding types:
    - Ungrounded
    - Solidly grounded
    - High and low resistance grounded
- Selection criteria for grounding methods

Specialized Studies

- **Harmonic Analysis**: generation, amplification, equipment effects, mitigation, and filter design
- **Transient Stability Studies**: system resilience during disturbances
- **Reliability Studies**: ensuring dependable system operation