

Basics for Protection Engineers - Virtual Training (ET-BASPR)

Objectives

This seminar provides the electrical engineering fundamentals required to understand modern protection and control systems used in utility and industrial power networks. Participants will gain a comprehensive overview of the structure and operational behavior of electrical power systems, as well as the most important equipment used in energy supply networks.

Special emphasis is placed on the physical phenomena associated with network faults and their effects on equipment and protection systems. This creates a solid foundation for understanding the tasks, functions, and requirements of protection devices and facilitates entry into advanced protection engineering training courses.

Upon completion of the seminar, participants will be able to:

- Describe the structure and operation of electrical power supply networks.
- Assess typical network faults and their consequences.
- Understand and classify the main components of a power system.
- Explain the role of instrument transformers and switching devices.
- Understand the fundamentals behind the application and parameterization of protection relays.
- Comprehend the relationship between network operation, network faults, and protection concepts.

Target Group

- New protection engineers
- Commissioning and service engineers
- Design and engineering personnel
- Employees of utility companies
- Operations and maintenance personnel from industrial facilities
- Career changers with a basic electrical engineering background

Content

Fundamentals of Electrical Power Supply Networks

- Structure and design of transmission and distribution networks
- Power flow in transmission and distribution systems
- Generator, consumer, and network operator perspectives
- Network operation under normal and fault conditions

Network Calculations and Power flow Conventions

- Fundamentals of power flow analysis
- Sign convention systems for generators and consumers
- Active, reactive, and apparent power

Short-Circuit Currents and Network Faults

- Causes and effects of short circuits
- Short-circuit power and its significance
- Three-phase and unbalanced network faults
- Impact on equipment and network stability

Neutral Grounding and Earthing Concepts

- Isolated, compensated, and solidly grounded networks
- Effects on earth-fault currents
- Application and function of arc suppression coils
- Importance for protection concepts

Equipment in Power Supply Networks

- Overhead lines and cables
- Power transformers
- Arc suppression coils
- Circuit breakers and load-break switches
- Fuses
- Medium- and high-voltage switchgear
- Reactive power compensation systems

Instrument Transformers in Protection Engineering

- Current transformers and voltage transformers
- Accuracy and protection class requirements
- Applications in metering, protection, and monitoring

Power Quality and Network Disturbances

- Voltage quality and supply quality
- Harmonics and flicker
- Reactive power and compensation
- Effects on network operation and equipment

Prerequisites

- Basic knowledge of electrical engineering
- Understanding of fundamental electrical quantities and AC technology

Note

This training can be booked as [FACE-TO-FACE Training](#) too.

CONTACT

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Type

Online-Training

Duration

2 days

Language

en