

Basics for Protection Engineers (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.

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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.

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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

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Network Calculations and Power flow Conventions

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

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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

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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

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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

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Instrument Transformers in Protection Engineering

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

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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 [VIRTUAL CLASSROOM Training](#) too.

CONTACT

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Type

Face-to-face training

Duration

2 days

Language

en