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Course Name

Industrial Power Distribution Systems Optimization

Sector Name

Electrical Engineering

Document Type

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Industrial Power Distribution Systems Optimization

Course Introduction

Special Protection Systems (SPSs).

Power system at the distribution Optimization level should be planned and designed with consideration for ease of operation. Such considerations include, but are not limited to, Optimization/ utilization of standard components, facilitation of availability of spare parts, optimization of post-contingency switching operations, reduction of operational risks, and use of special protection systems (SPSs). Also, to achieve the required power supply reliability, power system Optimization / planning-particularly for medium-voltage systems, must consider not only the system configuration and earthing, etc.

But also the arrangement of the stations, the choice of equipment, and so on. The decisions taken contribute substantially to both the design reliability and the operational reliability, and also influence each other. The course will discuss how future electrical loads can be integrated in the existing power utilities networks, industrial as well as oil and gas plants, to meet a high quality of supply. The quality of electrical power must guarantee the continuity of supply, fixed frequency, non-violation of voltage limits, cleanness of supply voltage signal, non-harmful motor starting currents, and smooth operation of power electronic devices.

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Target Audience

- ✓ Electrical Engineers
- ✓ Electrical Supervisors
- ✓ Maintenance Technicians
- ✓ Managers in charge of Instrument Installations
- ✓ Project Engineers

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Learning Objectives

✓ Distribution System Network configuration

✓ Explain standards and regulations as well as electric power.

✓ Normal and emergency power sources for industrial loads

✓ Protection devices selection and calculations

✓ Distribution systems related studies with target Optimization

✓ Optimization operation of the power distribution system

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Industrial Power Distribution Systems Optimization

Course Outline

✓ DAY 01

Module 1

- ✓ PRE-TEST
- ✓ Power System Component and Configuration
- ✓ Power distribution system standard voltage according to IEEE/IEC
- ✓ Electrical Distribution System Network Components
- ✓ Transformers
- ✓ Cables & OHTL
- ✓ Circuit breakers
- ✓ Switchboards
- ✓ Types of distribution systems and their Optimization
- ✓ Radial Distribution System
- ✓ Ring Distribution System
- ✓ Parallel feeder Distribution system
- ✓ Advantages and disadvantages of each type
- ✓ Operation characteristics of radial Distribution power system
- ✓ Operation characteristics of a parallel feeder radial Distribution power system
- ✓ Operation characteristics of the ring Distribution power system
- ✓ Factors affecting in Optimization Distribution system
- ✓ Voltage droop and Distribution system (Optimization)
- ✓ Short circuit level and Distribution system
- ✓ Meaning of industrial loads
- ✓ Classifications of loads

Module 2

- ✓ Power transformer systems
- ✓ Optimization of Distribution transformers' operation
- ✓ Distribution transformer component
- ✓ Magnet wires & bars of the transformer
- ✓ Coil / Winding Connections
- ✓ Transformer Core-type
- ✓ Transformer Shell-type
- ✓ Transformer Core Lamination
- ✓ Bushing
- ✓ Oils
- ✓ Gauges (Level, Temp., Pressure,…)
- ✓ Overloading of transformers
- ✓ Transformer types
- ✓ Self-air-cooled Transformer
- ✓ Forced Air Cooled Transformer
- ✓ Oil-Immersed Self-cooled Transformer (ONAN)
- ✓ Oil-Immersed forced air cooled Transformer (ONAF)
- ✓ Oil-Immersed Forced Water Cooled Forced Transformer (OFWF) Transformers maintenance and troubleshooting
- ✓ Distribution transformers protection
- ✓ Connection of the transformer
- ✓ Delta
- ✓ Star
- ✓ Open Delta Configuration

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Industrial Power Distribution Systems Optimization

Course Outline

✓ Day 02

Module 3

- ✓ Optimization of Power Cables
- ✓ Low-voltage level power cables
- ✓ Medium Voltage level power cables
- ✓ Power cables testing
- ✓ Megger test
- ✓ High pot test
- ✓ Power cables splicing
- ✓ Cold shrank type
- ✓ Hot shrink type
- ✓ Testing of power cables
- ✓ Basic introduction to switchgear
- ✓ Distribution panels component
- ✓ Distribution panel rating selection
- ✓ Distribution panel operation (isolation- control & protection)

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Industrial Power Distribution Systems Optimization

Course Outline

✓ Day 03

Module 4

- ✓ Optimization of Circuit breakers and fuse types & operation
- ✓ Circuit breaker types
- ✓ MCB Mini Circuit breaker
- ✓ MCCB Molded case circuit breaker
- ✓ Air Blast Circuit breaker
- ✓ Air Circuit breaker
- ✓ Vacuum Circuit breaker
- ✓ Oil Circuit breaker
- ✓ SF6 Circuit breaker
- ✓ Circuit breakers main component
- ✓ Close coil
- ✓ Trip coil
- ✓ Charge coils
- ✓ Motor applications for industrial loads
- ✓ Motor types and selection
- ✓ Motor controllers and drives

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Industrial Power Distribution Systems Optimization

Course Outline

✓ Day 04

Module 5

- ✓ Power Distribution Quality and Its Effect on Optimization
- ✓ Power Distribution Quality Standards
- ✓ Power System Distribution Quality
- ✓ Harmonics.
- ✓ Power Factor.
- ✓ Reactive power sources
- ✓ Effect of reactive power in a power system
- ✓ Introduction of harmonics
- ✓ Source of harmonics
- ✓ Causes of harmonics

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Industrial Power Distribution Systems Optimization

Course Outline

✓ Day 05

Module 6

- ✓ Disadvantages of harmonics
- ✓ Power system distribution harmonics level
- ✓ Reducing Harmonics IEEE519-1992
- ✓ Measure Harmonics Values
- ✓ Reducing harmonics values
- ✓ Power Distribution Design
- ✓ Use a rectifier with more pulses
- ✓ Delta-Delta and Delta-Wye Transformers
- ✓ Isolation Transformers
- ✓ Line Reactors
- ✓ Harmonic Trap Filters
- ✓ Harmonic filter types
- ✓ Passive filter
- ✓ Active filter
- ✓ Power Factor meaning
- ✓ Effect of low power factor
- ✓ Disadvantages of Low Power Factor
- ✓ Leading and lagging power factor:
- ✓ Causes Low Power Factor
- ✓ Correct Power Factor
- ✓ Power Factor meaning
- ✓ The relation between loads and power factor

- ✓ Effect of low power factor on
- ✓ Generators
- ✓ Transformer
- ✓ Cables
- ✓ Electronics Devices
- ✓ Relation between VSD & ESP on Power factor values
- ✓ Disadvantages of Low Power Factor
- ✓ Leading and lagging power factor
- ✓ Causes Low Power Factor
- ✓ The relation between Harmonics and power factor
- ✓ Power Factor correction PFC
- ✓ Capacitors banks
- ✓ Synchronous Motors
- ✓ FACTs devices

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
June 22, 2026	June 26, 2026	5 days	4250.00 $	UAE , Dubai
Oct. 26, 2026	Oct. 30, 2026	5 days	4250.00 $	UAE , Dubai
Sept. 14, 2026	Sept. 18, 2026	5 days	5950.00 $	USA , Los Angeles
Jan. 10, 2027	Jan. 14, 2027	5 days	4250.00 $	KSA , Riyadh

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