Training Course on Transformers and Switchgear Technology for Power Systems

Professional Development Training Course Outline

Category	Development	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In the evolving landscape of electrical power systems, the demand for efficient, safe, and reliable energy transmission and distribution continues to grow. The core of modern power systems lies in the robust operation of transformers and switchgear equipment, which are critical for voltage regulation, fault protection, and load control. Training Course on Transformers and Switchgear Technology for Power Systems equips professionals with comprehensive knowledge of transformer operation, protection systems, switchgear technologies, and smart grid integration. Emphasizing hands-on skills and industrial best practices, this course enhances competency in both high-voltage and low-voltage power networks.

Whether you're working with power transformers, circuit breakers, or protective relays, understanding the technologies behind these components is essential for system reliability and safety. From substation design to grid automation, this course focuses on real-world applications aligned with the latest innovations in electrical engineering, IoT-enabled switchgear, and digital substation systems. With practical case studies, simulations, and guided tutorials, learners will develop proficiency in maintaining, testing, and troubleshooting power system equipment to meet future energy challenges.

Programme Curriculum

Training Course on Transformers and Switchgear Technology for Power Systems

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Course Objectives

1. Understand core principles of power transformer operations
2. Analyze different types of switchgear systems and applications
3. Learn key methods of high-voltage insulation and arc protection
4. Explore digital switchgear and smart grid technologies
5. Design efficient substation layouts using modern tools
6. Evaluate transformer testing methods for performance assurance
7. Apply fault diagnosis techniques using real-time monitoring tools
8. Understand load balancing and voltage regulation strategies
9. Gain hands-on experience in circuit breaker operation
10. Interpret protection coordination and relay settings
11. Optimize maintenance strategies for reduced downtime
12. Study renewable energy integration in switchgear systems
13. Utilize IoT and AI applications for predictive maintenance

Target Audience

1. Electrical Engineers
2. Power System Technicians
3. Substation Design Engineers
4. Renewable Energy Professionals
5. Electrical Maintenance Personnel
6. Industrial Plant Engineers
7. Utility Company Professionals
8. Engineering Students and Graduates

Course Duration: 5 days

Course Modules

Module 1: Fundamentals of Transformers

- Transformer classification and core structure
- Voltage transformation principles
- Cooling systems in transformers
- Transformer losses and efficiency
- Standards and safety considerations

Module 2: Switchgear Basics and Operation

- Types of switchgear (LV, MV, HV)
- Air, gas, and vacuum insulation
- Arc extinction principles
- Manual vs. automated switchgear
- Switchgear rating and specifications

Module 3: Protection and Coordination

- Protective relays and settings
- Fault current analysis
- Coordination of circuit breakers
- Overcurrent and differential protection
- Relay testing and calibration

Module 4: Transformer Testing and Maintenance

- Insulation resistance testing
- Turns ratio testing
- Oil sampling and analysis
- Thermal imaging and diagnostics
- Preventive and predictive maintenance

Module 5: Circuit Breakers and Interruption Technologies

- Working principles of circuit breakers
- SF6 and vacuum interrupters
- Breaker timing and contact resistance testing
- Life cycle and refurbishment
- Environmental and safety aspects

Module 6: Substation Design and Grounding

- Substation components and layout planning
- Busbar configurations
- Grounding systems and calculations

- Lightning and surge protection
- Substation automation and control

Module 7: Smart Grid and Digital Switchgear

- Integration with IoT platforms
- Communication protocols (IEC 61850)
- Data acquisition and remote diagnostics
- Energy management systems
- Cybersecurity in digital substations

Module 8: Renewable Integration and Future Trends

- Role of switchgear in solar/wind farms
- Grid-tied transformer systems
- Hybrid switchgear systems
- Impact of EV charging infrastructure
- Future trends in AI and ML for grid systems

Training Methodology

- This course is delivered through interactive lectures
- Practical case studies
- Video tutorials
- Simulation labs
- Real-world project work
- Knowledge assessments

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

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