NETGroup Academy

Power System Components

Course Overview

Power Lines, Power Cables, Circuit Breakers and Power Capacitors are essential primary components of electrical power systems.

This course aims to provide electrical professionals with a clear understanding of these key and critical components within a power system context. It explains the physical characteristics, the role it plays in the power generation and delivery process and what it can and cannot do in terms of its operational specifications.

The course further provides an understanding of whole life cycle engineering management of these components in terms of its performance and manufacturing specifications, testing, safe operation and sound integration within a power system.

Topics

Power Lines

- Physical and constructional aspects - insulation - ground clearance
- Conductors types, size and bundling - corona and noise
- Electromagnetic coupling/electrostatic fields and interference
- Mechanical and electrical failure
- Shielding against lightning - earthing and earth conductor continuity
- Signal carriers and fiber optics
- Equivalent circuit - (resistance, series inductance, shunt capacitance)
- Power transmission capabilities - (regulation, active and reactive loading)
- System application requirements - (reactive compensation)
- Earth fault and ARC impedance
- Ferranti effect'- (voltage rise for capacitive loading)
- Impedance diagrams - surge impedance

Power Cables

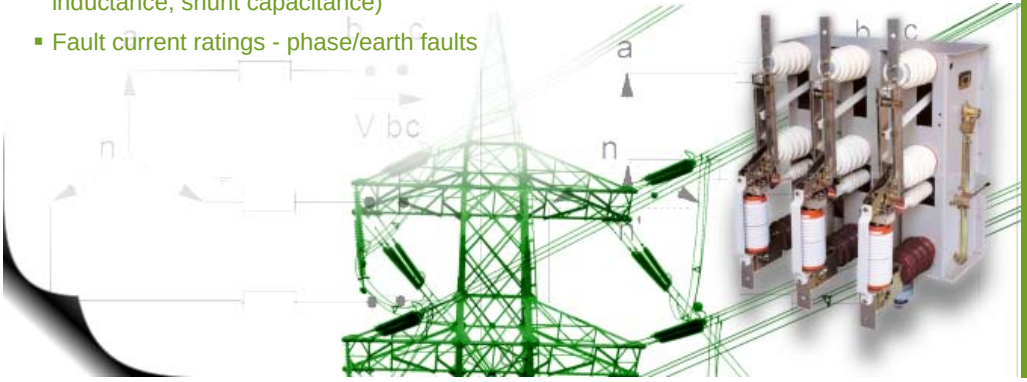
- Physical and constructional aspects - types - insulation - spacing
- Load current ratings
- Equivalent circuit - (resistance, series inductance, shunt capacitance)
- Fault current ratings - phase/earth faults

Circuit Breakers

- Main purposes
- Key performance requirements
- Principles and security of operation
- Insulation media
- Speed and current interruption
- Various types
- Current ratings and duty cycles
- Testing requirements
- Pole discrepancy
- Breaker failure management

Capacitors

- Main purposes
- Ratings
- Construction
- Dielectric - impregnation liquids
- Fuses and discharge resistor
- Failure modes
- Application in power system
- Effects under system fault conditions
- Special duties imposed on circuit breakers
- Harmonic voltage and current effects
- Standard sizes of large banks in Eskom



Course dates
TBA

Course duration
2 days – 08:30 to 16:00 daily

Course fees
R4 400 (incl. VAT)
per delegate

Course venue
NETGroup Academy
28 Regency Rd
Route 21 Corporate Park
Cnr Boeing & Nelmapius Rd
Irene, Centurion

What's included
- **Domain expert facilitators**
- **Training Guide**
- **Quality Training Venue**
- **Lunches and Refreshments**
- **Ample Parking**

Registration deadline
2 weeks prior to the scheduled course

Contact details
Tel: 012 345 6005 /
0861 NET GRP
Fax. 012 345 6633
email: academy@netgroup.co.za
Private Bag X14
Elardus Park
0047

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NETGroup Academy

Who should attend

Engineers, Technologists and Academics working in:

- **the power generation industry;**
- **industrial production plants;**
- **the electrical power consulting industry;**
- **power system fields involving planning, design, specification, construction, testing, commissioning, operation and maintenance of rotating power plant.**

Accreditation

This course is being accredited for 2 CPD points.

NETGroup Academy is registered with the ISETT SETA and Consulting Engineers South Africa as an accredited training service provider.

CESA
Consulting Engineers South Africa

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Outcomes

When you have completed this course, you will:

- understand and be able to describe the fundamental features, the role, electrical parameters, operating requirements and limitations as well as safe application and handling of these important and complex power components within a power system
- be able to judge the operational health of the equipment
- be able to perform fundamental testing and evaluation of compliance with specifications.
- be able to judge on the fitness and correct application and management of these devices within a given power system
- have a reasonable understanding of the requirements of suitable life cycle engineering management of these components.
- be able to support the planning, specification, technical evaluation, installation, and testing, operating and maintenance processes of these devices.

About the Venue

The NETGroup Academy's training facility offers two multiple purpose instruction rooms each comfortably accommodating up to 20 students in multiple desk layouts. Depending on the seating configuration, the rooms may accommodate lecture-style instruction or encourage interaction in the form of roundtable discussions and teleconferences.

Teas and lunches are arranged with the on site cafeteria and ample parking is available for students.

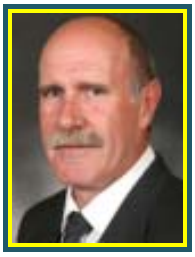
As a training facility for adult professionals, the NETGroup Academy offers a flexible and technologically-advanced learning environment that is safe, healthy, comfortable, aesthetically-pleasing, and accessible. Business stations and wireless access points with **complimentary Internet access** are available to allow students to carry out some business functions or to quickly connect with their organizations if need be during or between their training sessions.

Your Course Facilitators

Olaf von Abo

M.Dip. Electrical H.C.

Chief Design Eng.
NETGroup SA



Olaf has some 22 years practical experience in the Protection of High and Medium Voltage Transmission and Distribution networks.

Execution of projects for various utilities and large industrial companies in network and plant commissioning, audits, design, specification, power system analysis, protection coordination studies and project management has earned him wide regard as industry expert.

Hennie Harmse

Pr. Eng. B.Sc. (Elec.).
MSAIEE

Hennie holds in excess of 30 years experience in Power System Protection, Control and Measurement and the Management of Transmission and Distribution Systems. He has been actively involved in Power System training since 1994.