

# Power Quality & Reliability Course



14 – 16 April



Hilton Hotel Sandton / Live Online



Only 17 Seats Available



3 CPD Points from ECSA



## COURSE OVERVIEW

Power quality determines reliability of electrical equipment operation, performance of the assigned functions by it, service life. Problems of power quality attracted increased attention because of power quality degradation and not meeting customer expectations. Poor power quality has been shown to lead to reduced efficiencies, increased risk of downtime and higher energy and operating costs.

When it comes to power quality issues, the easiest and most effective solution to avoid unplanned shutdowns is the correction of voltage anomalies coming from the grid. This can be accomplished using harmonic filters, capacitors and other protective equipment.

Rises in non-linear and other challenging loads in modern electrical networks present unique power quality challenges. Sensitive operations, irregular loads and isolated or weaker grids demand stricter grid codes and power quality standards to safeguard the reliability of an electrical system for smooth industrial and commercial processes. Harmonics distortions, voltage variations, poor power factor and load unbalance are among the key elements that not only test the reliability of modern electrical systems but also induce overall greater system losses.



## MAIN COURSE FEATURES

- Basic terminology and definitions
- Voltage sags and interruptions
- Effects of fault clearing on voltage
- Reliability indices
- Transient overvoltages and arresters
- Understanding and mitigating harmonics
- Analysis of AC power and steady-state voltage regulation



## BENEFITS TO YOU

Upon completion of this course, the attendee should be able to:

- Understand common power quality and reliability terms
- Know how to assess the impact of voltage sags on sensitive electrical equipment
- Comprehend the influence of fault clearing on voltage stability
- Calculate and use standardized reliability indices
- Understand the sources of transient overvoltages and be able to specify arresters
- Know why harmonics are produced and be able to implement mitigation methods
- Analyze the components of AC power and understand the relationship with voltage regulation

This three-day training course is suitable to a wide range of professionals but will greatly benefit:

- Electrical Engineers / Plant Electricians / Electrical Maintenance Personnel
- Electrical Technicians / Instrumentation Personnel / Managers & Safety Professionals
- Engineers and technicians new to the power industry
- Intermediate-level engineers and technicians who seek to improve system reliability
- Professionals involved with the assessment of power quality
- Facility engineers and consultants responsible for mitigating power quality issues
- Engineers tasked with monitoring system performance and reliability



### DAY 1 – DAY 3

#### **Introduction and Power Quality Issues**

- Power quality definition and basics
- Importance of good and reliable power quality
- Quantifying power quality
- ITI curve
- Causes of voltage sags
- Causes of interruptions

#### **Transient Voltage Excursions**

- Motor starting
- Switching and traveling waves
- Capacitor switching
- Lightning
- Lightning shielding and grounding
- Ferroresonance

#### **Reliability Indices, Effects of Fault Clearing on Power Quality**

- IEEE-defined reliability indices
- Interpreting reliability indices
- Fault clearing
- Reclosing strategies
- Fuse saving philosophy
- Fuse blowing philosophy

#### **Harmonics and Mitigation Techniques**

- Fundamentals of harmonics
- Causes and effects of harmonics
- AC power and power factor
- Mitigating harmonic effects
- K-factor transformers
- Harmonic filters

#### **Insulation Coordination, Arresters, and Steady-State Voltage Regulation**

- Basic impulse level
- Insulation systems
- Insulation testing
- Arrester selection and application
- Load tap changers and voltage regulators
- Effects of steady-state voltage on system operation



### **Brief Bio**

**Professor Jerry Walker** is the director of a company that specializes in consultation on High Voltage insulation testing as well as the supply of test equipment for High Voltage applications. He is a Doctor of Technology graduate from the Vaal University of Technology, completed in 2005 with a thesis titled "Diagnostic Evaluation of Water Tree Aged XLPE-Insulated Cables".

He started with a Higher National Diploma in Electrical Engineering acquired at Vaal Triangle Technikon where he later worked as a lecturer in the Department of Power Engineering after completing his Bachelor of Technology Degree. In 2005 Jerry Walker was appointed an Associate Professor at Vaal University, and subsequently the head of the Institute for High Voltage Studies, a position he held until his retirement the following year.

Professor Jerry has over the years of acquiring field and academic experience; he also published a number of articles and journals on electrical power systems and has presented a number of papers at local and international conferences.

Note: Professor Jerry's full professional Biography is available on request.



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# Booking Form

#: **LM**

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Training Fee 3 (Days) = R 17,999 + VAT
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