



Upgrade Your Skills Power Quality and System Stability Training

Course Delivery: Onsite at Kafue Gorge Regional Training Centre, Zambia

Dates: 27th March to 31st March 2023

Course Overview

This Power Quality and System Stability course is an introduction to the major concepts and issues in Power Quality Management and System Stability.

Course Outcomes

At the end of the training programme, course participants shall be able to:

1. Discuss the Components and Operations of a Power System;
2. Explain the importance of Power Quality;
3. Classify Power System Stability;
4. Mitigate and Monitor Power Quality;
5. Configure and set up Power Quality Analyzers;
6. Mitigate Power System Disturbances and Blackouts

Course Outline

Day One: General Theory and Introduction

1. Power Quality overview
 - a. Concepts and Theory
 - b. Financial Consequences of Power Quality disturbances
 - c. Measurement of Power Quality
 - d. Power Quality monitoring
2. Power Quality and its importance
 - a. Power Quality Disturbances
3. High Level Classification of Power Quality
 - a. Power Quality Events
 - b. Power Quality Variations
4. Power Quality Variations (Harmonics)
 - a. What is Harmonics
 - b. Harmonics estimation
 - c. Root Cause of harmonics
 - d. Mitigation of harmonics
 - e. Standards about harmonics

Day Two: Power Quality

1. Power Quality Variations (Frequency)
 - a. What is Frequency Deviation
 - b. Frequency estimation
 - c. Root Cause of Frequency Deviation
 - d. Mitigation of Frequency Deviation
 - e. Standards about Frequency Deviation
2. Power Quality Variations (Flicker)
 - a. What is Flicker
 - b. Flicker estimation
 - c. Root Cause of Flicker
 - d. Mitigation of Flicker
 - e. Standards about Flicker
3. Power Quality Variations (Unbalance)
 - a. What is Unbalance
 - b. Unbalance estimation
 - c. Root Cause of Unbalance
 - d. Mitigation of Unbalance
 - e. Standards about Unbalance

Day Three: Power Quality

1. Power Quality Events (Voltage Dip)
 - a. What is Voltage Dip
 - b. Voltage Dip Estimation and Triggering Methods
 - c. Classification of Voltage Dip
 - d. Root Cause of Voltage Dip
 - e. Consequence of Voltage Dip
 - f. How Voltage Dip travels in Power System
 - g. Locationing of Voltage Dip
 - h. Mitigation of Voltage Dip
 - i. Standards about Voltage Dip
2. Power Quality Events (Interruption)
 - a. What is Interruption
 - b. Interruption Estimation and Triggering Methods
 - c. Classification of Interruption
 - d. Root Cause of Interruption
 - e. Consequence of Interruption
 - f. How Interruptions travels in Power System
 - g. Locationing of Interruption
 - h. Mitigation of Interruption
 - i. Standards about Transient

Day Four: Power Quality

1. Power Quality Events (Transient)
 - a. What is Transient
 - b. Transient Estimation and Triggering Methods
 - c. Classification of Transient
 - d. Root Cause of Transient
 - e. Locationing of Transient
 - f. How Transient travels in Power System
 - g. Mitigation of Transient
 - h. Standards about Transient
2. Power Quality Events (Swell)
 - a. What is Swell
 - b. Swell Estimation and Triggering Methods
 - c. Root Cause of Swell
 - d. Consequence of Swell
 - e. How Swell travels in Power System
 - f. Locationing of Swell
 - g. Mitigation of Swell
 - h. Standards about Swell
3. Thunderstorm
 - a. How thunder hits the lines
 - b. Consequence of Thunder
4. New Topics in Power Quality
 - a. AI and Power Systems
 - b. AI and Power Quality
5. Experience of Customers
6. Mitigation Companies

Day Five:

1. Renewable Energies
 - a. Different types of Renewable Energies
 - b. How to assemble a Solar Panel based Energy production for a household
2. Power System Stability classification
 - a. Frequency Stability – Causes and Consequences
 - b. Voltage Stability – Causes and Consequences
 - c. Angular Stability – Causes and Consequences
3. Renewable Energies and Power System Stability
4. Frequency stability
 - a. Power Balance
 - b. Control
 - c. Mitigation
5. Voltage Stability
 - a. Reactive Power
 - b. Control
6. Angular stability
 - a. Power System Stabilizers
 - b. Tuning and optimization

Participants' Profile/Target Group

Managers and engineers responsible for power quality, power system stability and grid operation.

Delivery: The course will be facilitated by well-experienced specialists with extensive experience in power quality systems and power system stability from **Unipower** of Sweden and **Chalmers** the university of technology.

Course Fees: **USD 1,000** per participant

Includes: Certificate of Competence upon successful completion of the course

For enquiries and enrollment go to:
<https://www.kgrtc.org.zm/course-application>
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