



THE NIGERIAN INSTITUTION OF ELECTRICAL AND ELECTRONICS ENGINEERS (NIEEE)

A Division of

The Nigerian Society of Engineers (NSE)

ABUJA CHAPTER

Presents its

5-DAY TRAINING WORKSHOP

ON

EARTHING, LIGHTNING AND SURGE PROTECTION COURSE

OVERVIEW:

The design and performance of an earthing solution can have a major impact on safety, security of electricity supplies, power quality, construction costs and quality in communication systems. Standards concerning earthing have changed, introducing new concepts, design criteria and limit values. It is essential therefore, that companies and practitioners remain fully aware of modern practice and the new design tools, measurement techniques and equipment that are available to help engineers.

The course offers a practical session covering soil resistivity, earth resistance tests, a comparison of different instruments, analysis of results and many more. Course places are limited to ensure high quality interaction during the practical sessions, presentations and case studies.

TOPICS COVERED

- Statutory requirements and standards
- Earthing system components
- Earthing system design
- Earth resistance measurement and substation earthing assessment
- Hazards and safety precautions associated with earthing & Prevention
- Soil characteristics, resistivity and structure in relation to the design of earthing systems

FOR WHOM?

Electrical Engineers & Technicians, Facility Managers, Project Managers, Maintenance Personnel Power System Protection and Control Engineers,

Instrumentation & Control Personnel, Plant Operators & Risk Assessors, Government Safety Regulators/ Inspectors, Allied Personnel in Rail, Oil & Gas, Mining, Construction and Academia.

Date: 22nd - 26th October 2018

Time: 9.00am Daily

Venue: Triune Hall, No. 42 Onitsha Crescent, off Gimbiya Street, Area 11, Garki-Abuja.

Course Fee: **N60,000.00 (Sixty Thousand Naira only)**

Fee covers Course Materials, Certificates, Group Photograph, Coffee/Tea Breakfast and Lunch.

- * 15% Discount for up to date Members
- * 10% Discount is available for early bird registrants; early bird registration ends 19th October, 2018
- * 25% Discount for NYSC Members and Students

PAYMENT MODE:

All legal means of payment can be used to make payment into the Institution's BANK ACCOUNT only. Cash transaction is also accepted at the Course Venue.

ACCOUNT NAME: **NIGERIAN INSTITUTION OF ELECTRICAL & ELECTRONICS ENGINEERS**

ZENITH: **1013931781** or

FIRST BANK: **2010348420**

Note: Only Evidence of payment can admit participants.

COURSE RESOURCE: **TESTED FIELD/INDUSTRY EXPERTS**



ENQUIRIES

FOR ENQUIRIES CONTACT ANY OF THE FOLLOWING NUMBERS: 08129450533, 08131299743, 08023210283

Learning outcomes:

- * Principles of design, testing and maintenance of earthing systems and equipment
- * Hazards and safety precautions associated with earthing
- * Requirements and procedures for electrical safety compliance standards
- * New methodology for carrying out lightning risk assessments on distribution lines
- * The role of earthing in the mitigation of noise in electrical systems
- * Soil characteristics, resistivity and structure in relation to the design of earthing systems.

Course Details

Day one

Session 1: Fundamentals and Preliminaries

- * Reasons for Power Systems Earthing
- * Reasons for Equipment Earthing (Bonding)
- * Touch and Step Potentials
- * Power System Earth Systems (LV, MV and HV)
- * Earthing and International / National Standards

Session 2: Systems Components

- * Air terminals location, size and materials
- * Minimum requirements for roof and ground conductors
- * Connectors and fittings

Session 3: Importance of Neutral Grounding

- * Reduced magnitude of transient over voltages
- * Simplified ground fault location
- * Improved system and equipment fault protection
- * Reduced maintenance time and expense
- * Greater safety for personnel
- * Reduction in frequency of faults

Session 4: Methods of Neutral Grounding

- * Unearthed neutral system
- * Solid neutral earthed system
- * Resistance neutral earthing system
- * Resonant neutral earthing system
- * Transformer earthing

Day two

Session 5: Body Current Limit

- * 1 mA: Threshold of perception
- * 1 mA to 6 mA: Let-go currents
- * 9 mA to 25 mA: Painful, difficult to release energized objects
- * 25 mA to 60mA: Muscular contractions, breathing difficult
- * 60 mA to 100mA: Ventricular fibrillation

Session 6: Earth Electrode Systems

- * Objectives
- * Resistance Requirements
- * Soil Resistivity
- * Measurement of Soil Resistivity
- * Types of Earth Electrode Systems
- * Resistance Properties
- * Measurement of the Resistance of Earth Electrodes

Session 7: Electrode Enhancement and Protection

- * Electrode Enhancement
- * Cathodic Protection
- * Lightning Protectors
- * Resistance and Surface Potential Distribution of Typical Earth Electrode Construction
- * Constructional aspects of Earths of Earthing Electrodes

Session 8 : Recommended Design & Installation Practices

- * Wiring and grounding for safety and performance
- * Wiring and distribution systems
- * Dedicated and derived neutral systems
- * Grounding and bonding systems

Day three

Session 9: Static electricity and protection

- * What is static electricity and how is it generated?
- * Examples of static charge build up and its dangers
- * Energy of spark due to static electricity
- * Ways of controlling static build up
- * Risk assessment and preventive measures

Session 10: Soil Resistivity Testing

- * Wenner method
- * Schlumberger method
- * Soil resistivity variability

Session 11: Physics of lightning and Lightning Protection

- * Physics of Lightning
- * Electrical Surges due to Lightning
- * Lightning Waveforms
- * Lightning Protection Systems (Evaluation and Selection)
- * Lightning Protection of Electricity Supply Systems
- * Lightning Protection for Buildings

Session 12: Surges and surge protection

- * Causes and mitigation of surges
- * Ways by which surges couple into electrical circuits
- * Principles of surge protection and commonly used devices
- * Graded surge protection
- * Relative merits of different types of surge protection devices for sensitive instrumentation
- * Surge protection of telemetry and data communication systems

Day four

Session 13: Power Conditioning

- * Power conditioners
- * Uninterruptible power systems
- * Power quality alternative sources

Session 14: Quality (PQ) — Electrical noise and mitigation

- * Wiring and Grounding for Power Quality
- * Electrical Environment and Causes of Power Quality / Noise Disturbances
- * PQ and Grounding for PQ
- * Typical Wiring and Grounding Problem
- * Minimize Electrical Interference
- * Shielding Methods

Session 15: Practicals (Excursion)

Day five

Session 16: Power Quality (PQ) — Harmonics

- * Frequency and Power Quality
- * Effects of Harmonics in Electrical Systems
- * Minimize Harmonic Interference

Session 17: Award of Certificate & Closing