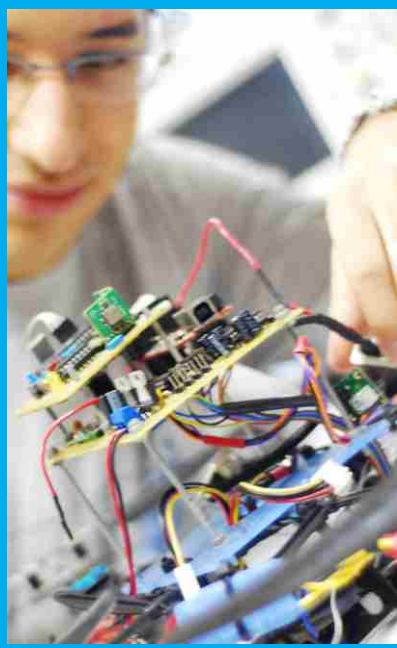


# LIGHTNING, SURGE PROTECTION AND EARTHING

of Electrical & Electronic Systems



## What You Will Learn...

- Select and apply an appropriate lightning dissipation system
- Understand how ground electrodes work and their role in preventing lightning and surges from damaging equipment
- List the types of systems that cannot be grounded
- Describe what systems can be operated ungrounded
- Correctly select and apply surge protection appropriate to the type of equipment being protected
- Apply practical knowledge of surge and transient protection
- Troubleshoot and fix Earthing and surge problems
- Design, install and test an effective Earthing system for electronic equipment
- Understand lightning and how to minimise its impact on your facility
- Protect sensitive equipment from lightning

**SmartBrains** Oil and Energy Institute provides premium training courses for energy industry executives and fresh engineering graduates. Our success and distinguished reputation is thanks to our commitment to provide first-class programmes to our clients. Combining leading professionals from across the industry as lecturers and an interactive, practical format, the lessons learnt in a SmartBrains for Energy course are directly transferable back to the work place.

## Our Strategic Objectives

To be recognized by industry and employers as a highly reputable training organization. Provide dynamic leadership, sound management and excellence in training. Continue to improve our services through quality management processes. Invest in and value our people through professional development activities. Grow our business through innovation and to continue to be financially secure. Be influential in the economic development of the industries we serve nation wise

## Our Mission

“To provide quality training and assessment services and to prepare our students for a fulfilling professional career in their chosen industry. We are committed to upholding our values of providing excellence in training”

# Course STRUCTURE



“I would like to thanks T&P Team of Smartbrains who helped me to get skill set on Electrical System Design. The learning experience was good and placement is excellent”

**Zeshan Ahmad**

Ankit Electrotech Engineers Pvt Ltd, Noida

### DAY ONE

#### INTRODUCTION AND BASICS

- Fundamentals of Earthing
- Bonding
- Lightning
- Surge Protection
- Dissipation Arrays

### DAY TWO

#### ELECTRICAL FAULTS

- Ground Fault Circuit Interrupters
- Equipment Ground Fault Protection Systems

## RECOMMENDED DESIGN AND INSTALLATION PRACTICES

- Wiring and Earthing for Safety and performance
- Wiring and Distribution Systems
- Dedicated and derived Neutral Systems
- Earthing and bonding equipment
- Earth electrodes and earth mats
- Supplementary earthing systems (chemical earths)

## FUNDAMENTALS OF EARTHING FOR BUILDING ELECTRICAL SYSTEMS

- Earthing of Building Systems
- Which Electrical Systems can be operated ungrounded
- Proper methods of Earthing Building Electrical Systems
- Location of the service Earthing Connection
- Proper Sizing of Grounded (Neutral) Conductors

## TYPICAL RULES TO BE APPLIED

- Rules for multiple services to one Building
- Rules for Low Impedance and High Impedance Systems
- Rules for Bonding Requirements at Building Service Equipment
- Earthing Electrodes, Systems and Conductors
- Bonding Enclosures and equipment
- Equipment Earthing Conductor types
- Enclosure and Equipment Earthing
- Earthing of separately derived Systems
- Earthing at more than one building
- Disconnecting means for separate buildings

## EARTHING AND NOISE CONTROL

- Misconceptions of performance Earthing
- Single Point versus Multi point techniques
- Noise and Zero Signal Reference Grid
- Avoiding Non recommended practices
- Shielding

## APPLICATIONS OF EARTHING AND BONDING

- Earthing and Bonding in Hazardous (classified) locations
- Earthing and bonding for Health Care
- Earthing and Bonding for swimming pools, hot tubs and spas
- Static and Electricity: Earthing and Bonding Requirements
- Common Violations
- Building Electrical Inspection Procedures
- How to recognise Hazards

## LIGHTNING

- Need for a lightning protection system
- Which protection systems work and which don't
- Best location for IT equipment
- Optimum Earthing for building
- Pitfalls of isolated Earthing
- Shielding and bonding of electronics and communications
- Optimum location of surge protection devices

## SURGE AND TRANSIENT PROTECTION

- Lightning Phenomena
- Protection of Power Supply
- Protection of Electric Communications Circuits
- Power System Faults and Switching Surges
- Mitigation techniques
- Case Studies

## POWER CONDITIONING

- Power Conditioners
- Uninterruptible Power Systems
- Power Quality Alternative Sources

# Why

## SmartBrains?

SmartBrains is the ultimate choice for all the working & non working engineer's in energy Sector training requirements. Our extensive portfolio of energy training courses are:

- ▶ 100% focused on the Oil and energy industry.
- ▶ Guided by the industry's renowned professionals with unprecedented knowledge of the Oil and energy industry.
- ▶ Highly interactive program with practical and relevant case studies.
- ▶ Training by extensively researched self developed cutting edge techniques.
- ▶ Skill development techniques with comprehensive set of documentation, practical skills and tools used in the Industry.

### Admission

#### Requirements

- ▶ Duly Filled Application Form
- ▶ 2 Photographs
- ▶ Photo State of Qualifying Examination
- ▶ Address Proof
- ▶ I.D. Proof
- ▶ Latest Resume



- ▶ The perfect opportunity to develop network and experiences with knowledge sharing.
- ▶ Internationally acclaimed engineering qualification.
- ▶ Designed for both Fresh engineers and working professionals to attain growth in oil and energy industry.
- ▶ One of the finest international faculty.
- ▶ Interactive, interesting and motivational training sessions.
- ▶ Access to enormous reference books and research materials.

### Declaration

- ▶ This training program is on AUTONOMOUS basis conducted by SmartBrains.
- ▶ SmartBrains has right to expel any student at any time for misbehavior, poor attendance without refunding the fees.
- ▶ Certification will be issued only after completion of course, submission of all assignments and passing all the examinations.
- ▶ SmartBrains has its own rules and regulations about conducting examinations and assessment of examinations

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