

## TUTORIAL 1

### ELECTRICAL SAFETY ARCHITECTURE: FUNDAMENTALS, GROUNDING AND NEUTRAL REGIMES



#### GENERAL

**Speaker:** Eng. Gustavo Salloum

**Hours:** 8:30 a.m. to 4:30 p.m.

**Aimed at:** Electrical engineers, electrical technicians, designers, auditors, inspectors and industrial safety professionals.

#### OFFICIAL SUMMARY FOR THE TUTORIAL

##### "Electrical Safety Architecture: Fundamentals, Grounding and Neutral Regimes"

In industrial environments, electrical safety is not optional: it is a strategic pillar for operational continuity, personnel protection and regulatory compliance. This specialized tutorial provides a comprehensive and up-to-date overview of the fundamentals structuring electrical safety in low and medium voltage systems, with an emphasis on the critical role played by grounding systems and neutral regimes.

From a technical and regulatory approach, international models such as NFPA 70E, IEEE, IEC 60364 and OSHA will be analyzed, showing how they converge in real industrial environments and what common errors compromise safety in the field. The most commonly used grounding typologies in complex electrical installations (substations, telecommunications, lightning protection, static control) will be addressed, as well as the direct influence of the neutral regime on fault response, the selection of protections and the design of safe installations.

Designed for engineers and technicians in the electrical and industrial sector, this tutorial provides key tools for the analysis, diagnosis, design and audit of electrical systems with a global vision and preventive approach. An unmissable space for those who want to go beyond basic compliance and build true safe electrical infrastructures.

## PROGRAMMATIC CONTENT

### MODULE 1: GLOBAL FUNDAMENTALS OF ELECTRICAL SAFETY

- Comprehensive electrical safety concept: beyond PPE and protections
- Types of electrical risk: shock, arc, ignition, indirect contact, systemic failure
- Proactive vs. Reactive Approach to Electrical Design and Operation
- Electrical Risk as a Function of System Architecture: A Holistic View
- International Electrical Safety Management Models (NFPA 70E, IEC 60364, ISO 45001)

### MODULE 2: KEY INTERNATIONAL RULES AND REGULATIONS

- NFPA
- IEEE
- OSHA 1910 – Subpart S (USA)
- Regulatory compliance framework: risks, responsibilities and oversight
- How regulations converge in international projects and multinational audits

### MODULE 3: GROUNDING SYSTEMS – THE HIDDEN HEART OF SAFETY

- Functional and energetic definition of grounding
- Objectives: protection of lives, operational continuity, power quality
- Types of grounding:
- Safety
- Of the system
- For Substations
- For Lightning Protection System
- For sensitive equipment (Telecommunications and computing)
- Static Control

### MODULE 4: NEUTRAL REGIMES AND THEIR IMPACT ON SAFETY

- What is the neutral regime? Why is it critical?
- International classification (according to IEC 60364):
- TT Systems
- TN Systems (TN-C, TN-S, TN-C-S)
- IT Systems
- Land regimes IEEE classification

## EXPECTED OUTCOMES FOR PARTICIPANTS

- Understand the deep relationship between safety, grounding, and neutral
- Acquire technical criteria to evaluate electrical installations with an international safety approach
- Identify hidden risks arising from poor practices in the selection or implementation of ground and neutral systems
- Understand the main global regulatory frameworks and how to apply them correctly
- Apply knowledge in audits, design, maintenance and operation of low and medium voltage electrical systems