



Basic Electricity for the non-electrician

This development course is available in both virtual and in-person, instructor-led formats, it is a two-day Basic Electricity development course. It is the most popular of our offerings. It provides a foundational understanding of how electricity works in commercial and industrial settings. The basic Electricity for non-electricians includes hands-on electrical skills improvement and is designed to train maintenance technicians and other non-electrical personnel working in industrial settings or commercial buildings.

Description:

In this course, team members are immersed in practical, real-world examples that illustrate how electricity is distributed and used in their plants and facilities. They'll learn how to use electrical test equipment in their everyday jobs before moving on to an in-depth discussion about major electrical components, where and how these electrical components work, and their purposes within electrical systems. The goal of this basic electrical training course is to teach team members how to reduce electrical equipment downtime, improve overall efficiency and safety, and fix problems they've been unable to solve on their own. This course can be adopted as part of a company's regular Qualified Electrical Worker program.

Course Outline:

Day One - Topics

Electrical Fundamentals

1. How Electricity Is Produced – Six Different Methods
2. DC and AC in Plants and Facilities – Hands-on Exercise
3. Voltage, Current and Resistance; Ohm's Law
4. Hands-on Circuit-building Activities with Field Components
 - a. Simple Circuit
 - b. Series Circuit
 - c. Parallel Circuit
 - d. Combination Circuit



- e. Using Multimeters to Measure Voltage, Current, and Resistance in Circuits
- f. Verifying a Circuit is De-energized
- g. 3 Modes of Failure: Open Circuits, Short Circuits, and Ground Faults
- h. Power: What it is, and How It's Determined
- i. Single-phase and Three-phase Systems

Electrical Test Equipment

1. Multimeters – Hands-on Exercise
2. Voltage Testers
3. Clamp-on Ammeter, Megohmmeters & Others

Understanding Your Building's Electrical System

1. Reading Electrical Single-Line Diagrams
2. Major Components
3. The Electrical Service
4. Motor Control Centers
5. Transformers – How they work
6. Delta vs. Wye connected systems
7. Switchgear and Circuit Breakers
8. Overcurrent Protective Devices
9. Feeders
10. Disconnects
11. Motors, Panelboards, and Branch Circuits
12. Lighting Circuits
13. Electrical Floor Plans & Facility Wiring

Day Two – Topics

Electrical Safety in the Workplace

1. Introduction to NFPA 70E®
2. Hazards & Dangers of Electricity
3. Shock, Arc Flash, and Arc Blast



4. Personal Protective Equipment (PPE)
5. Lockout/Tagout (LOTO)
6. Developing Safe Work Practices

The National Electrical Code®

1. Purpose, Overview & Definitions
2. Installation Requirements
3. "Qualified Electrical Workers"

Wire Selection

1. Conductor Types & Materials
2. Wire Size and Wire Insulation

Installing Wire (Conductors)

1. Raceways & Cable Trays
2. Conduits
3. Fittings and Boxes
4. Dedicated Working Space
5. Sizing of Fuses/Circuit Breakers
6. Sizing of Motor Overloads
7. Conduit Fill Considerations

Wiring Equipment

1. Wire Nuts, Terminals and Crimpers – hands-on exercise
2. Switches and Receptacles – hands-on exercise
3. Fluorescent Ballasts
4. Motors
5. Temporary Wiring

Basic Troubleshooting Techniques

1. Branch Circuit Problems



TRANSFORMATIONAL
PERFORMANCE SOLUTIONS



2. Control Circuit Troubleshooting
3. Checking and Replacing Fuses

Electrical Maintenance Activities

1. Performing Checks as part of an Assured Equipment Grounding Program
2. Use and Operation of GFCI's
3. Types of Electrical Maintenance
4. Special Precautions