

BASIC ELECTRICITY





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Course Objective

- > To understand the different components circuit breakers
- > To understand the Electrical Fundamentals
- > To understand the Electrical Test Equipment for Everyday Use
- ➤ Understanding Your Building Electrical System
- > To understand the Working Safely with Industrial Electricity
- > To understand the National Electrical Code® (NEC)
- > To understand the Wire Selection
- ➤ To understand the Installing Wire (Conductors)
- > To understand the Installing and Wiring Equipment
- > To understand the Basic Troubleshooting Techniques

Target Audience

- ➤ Electrical Engineers
- ➤ Electrical Supervisors
- ➤ Electrical Technicians
- ➤ Electrical Project Engineers
- ➤ Mechanical Professional staf





Course Outline

Day 1

Electrical Fundamentals

- ➤ How Electricity Is Produced Six Different Methods
- > DC and AC in Plants and Facilities Hands-on Exercise
- ➤ Voltage, Current and Resistance; Ohm's Law
- ➤ Hands-on Circuit-building Activities with Field Components
- ➤ Simple Circuit
- > Series Circuit
- ➤ Parallel Circuit
- ➤ Combination Circuit
- ➤ Using Multimeters to Measure Voltage, Current, and Resistance in Circuits
- ➤ Verifying a Circuit is De-energized
- ➤ 3 Modes of Failure: Open Circuits, Short Circuits, and Ground Faults
- ➤ Power: What it is, and How It's Determined
- ➤ Single-phase and Three-phase Systems

Day 2

Electrical Test Equipment

- ➤ Multimeters Hands-on Exercise
- ➤ Voltage Testers
- ➤ Clamp-on Ammeter, Megohmmeters & Others
- ➤ Understanding Your Building's Electrical System
- ➤ Reading Electrical Single-Line Diagrams
- ➤ Major Components
- > The Electrical Service
- ➤ Motor Control Centers
- ➤ Transformers How they work
- Delta vs. Wye connected systems
- Switchgear and Circuit Breakers



- > Overcurrent Protective Devices
- > Feeders
- ➤ Disconnects
- ➤ Motors, Panelboards, and Branch Circuits
- ➤ Lighting Circuits
- ➤ Electrical Floor Plans & Facility Wiring

Day 3

Electrical Safety in the Workplace

- ➤ Introduction to NFPA 70E®
- ➤ Hazards & Dangers of Electricity
- ➤ Shock, Arc Flash, and Arc Blast
- Personal Protective Equipment (PPE)
- ➤ Lockout/Tagout (LOTO)
- ➤ Developing Safe Work Practices
- ➤ The National Electrical Code®
- ➤ Purpose, Overview & Definitions
- ➤ Installation Requirements
- ➤ "Qualified Electrical Workers"
- ➤ Wire Selection
- ➤ Conductor Types & Materials
- ➤ Wire Size and Wire Insulation

Day 4

Installing Wire (Conductors)

- ➤ Raceways & Cable Trays
- **➤** Conduits
- > Fittings and Boxes
- ➤ Dedicated Working Space
- ➤ Sizing of Fuses/Circuit Breakers
- ➤ Sizing of Motor Overloads
- ➤ Conduit Fill Considerations



- Wiring Equipment
- ➤ Wire Nuts, Terminals and Crimpers hands-on exercise
- ➤ Switches and Receptacles hands-on exercise
- > Fluorescent Ballasts
- ➤ Motors
- > Temporary Wiring

Day 5

Basic Troubleshooting Techniques

- ➤ Branch Circuit Problems
- ➤ Control Circuit Troubleshooting
- Checking and Replacing Fuses
- Electrical Maintenance Activities
- Performing Checks as part of an Assured Equipment Grounding Program
- ➤ Use and Operation of GFCI's
- > Types of Electrical Maintenance
- > Special Precautions

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