

# Level 1: Fundamentals

## Electricity

Decrease production downtime, improve efficiency and increase output – All hinges on understand electricity and how to work with it safely. These courses have been specifically developed to give students the knowledge and skills required to enable them to work safely and effectively with electricity. The lab components of the training offer the student the opportunity to build, test and troubleshoot AC/DC circuits and examine the operating voltages and currents related to proper circuit operation. Technicians will use various instruments to make circuit measurements and calculations.

### Course Topics

- Basic concepts of electrical circuits, both in direct current (DC) and alternating current (AC)
- Ohm's law
- Kirchhoff's voltage and current laws
- Using measuring instruments (voltmeters, ammeters, ohmmeters, etc.)
- Solving series and parallel circuits
- Electromagnetism
- Electrical distribution
- Troubleshooting electrical circuits
- Exploration of the most common electrical components: power sources, resistors, inductors, capacitors, transformers, switches, relays, motors

### Core Competencies

- Explain the working principles of an electrical circuit
- Safely and effectively measure an electrical circuit
- Identify, sketch and describe basic electrical components and devices
- Build, test & troubleshoot basic electrical circuits
- Read basic electrical circuit diagrams
- Calculate impedance and inductive/capacitive reactance
- Safely and effectively measure an AC electrical circuit using a DMM
- Measure AC waveforms using an oscilloscope
- Determine waveform frequency using an oscilloscope

### Equipment

#### AC/DC Training System

- DC power source (protected)
- AC power source (protected)
- A selection of resistors
- An inductor, parallel-connected to a fluorescent light
- Two capacitors
- Transformer
- A selection of switches: SPST, SPDT, DPDT, NO push button, NC push button, selector switch, knife switch
- DC relay
- AC relay
- A selection of indicator lights: green, yellow, red
- Potentiometer
- DC motor
- Solenoid
- Buzzer
- Circuit Breaker with test components
- Fuse



Oscilloscope and Function Generator also required