Basic Electrical and Instrumentation Design Course

Venue Information

Venue: London UK

Place:

Start Date: 2025-12-22

End Date: 2025-12-26

Course Details

Net Fee: £4750.00

Duration: 1 Week

Category ID: EAPET

Course Code: EAPET-66

Syllabus

Course Description

This five days course covers the electrical principles and components used in Electrical systems and industrial instrumentation, emphasizing safety. You'll cover schematic symbols and the use of basic test equipment.

This course will cover:

- Direct and Alternating Current Circuits: DC Potential Sources, Conductors, Resistances, Switches, Energy Transfer (Current), Values and Currents, Peak and Amplitude, Peak-to-Peak Amplitude, Frequency, Conversion Units, Phase
- Overcurrent Devices: Fuses, Circuit Breakers, Overloads
- Inductance and Capacitance: Electromagnetism, Transition Effects, Inductive Reactance, Inductive Kick, Relays, Solenoids, Contactors, Values and Units, Capacitive Reactance, Capacitors (Type Values)
- Applied Circuits: Impedance, Resonance, Power Factor
- Measuring Equipment: Voltmeter, Ammeter, Ohmmeter, Wattmeter

- Poly-phase Sources: 3 Phase, Y, Delta, Blind Delta Connection

Course Objectives

At the end of this course the participant will be able to:

- Evaluate the direct current (DC) relationships between voltage, current, and resistance
- Determine alternating current (AC) characteristics including amplitude, frequency, and phase
- Identify the properties of an inductor and of a capacitor
- Use basic test equipment to evaluate and determine basic electrical characteristics
- Apply safety considerations when measuring electrical values or working around electrical equipment
- Compare bridge operation in balanced and unbalanced condition
- Identify schematic symbols used for electrical devices
- Understand poly-phase voltages and currents found in the industrial environment
- Understand how to install, test, commission and maintain electrical equipment

Course Outline

- **Electrical Properties**
    - Basic Electricity, The Atom, Electrons of Different Materials, Electrical Terms
    - Voltage, Current, Resistance, Electrical Circuit, Sources of Electricity
- **Magnetism**
    - Magnetic Field, Generating DC & AC Electricity, Controlling Voltage
    - The Sine Wave, Frequency, RMS Voltages, Multi Phase Power
- **Law's of Electricity**
    - Ohm's Law, Variations, Sample Problems
    - Kirchoff's Laws, Watt's Law, Computing Watts
- **Electrical Measurements**
    - Safety Precautions in Measuring Voltage, Current, Resistance
    - Series & Parallel Resistances, Combination Circuits (DC Bridge)
- **Electrical Schematic Symbols**
    - Resistors, Switches, Push Buttons, Overloads, Limit Switches
- **Capacitance**
    - Electrostatic Field, Dielectric Materials, Capacitors in Series & Parallel
    - RC Time Constant, Capacitive Reactance
- **Inductance**
    - Magnetic Field, Solenoids, LR Time Constant, Inductive Kick
    - Inductive Reactance
- **Impedance and Resonance**

    - Step-Up & Step-Down, Turns Ratio, Load Currents, Efficiency
    - Applications in Power Distribution
- **Electromechanical Devices**
    - Relays, Solenoids (AC/DC), Contactors and Sealing Circuits
- **Industrial Power**
    - Grounding Systems: Solidly Grounded, Rods, Grids, Maintenance
    - Three-Phase Power, WYE & Delta Transformers, Common Voltages
- **Overcurrent Protection**
    - Fuses (Plug, Cartridge), Circuit Breakers
    - GF Protection Devices
- **Industrial Wiring**
    - Grounding, Power & Signal Wiring, Conductor Identification
    - Color Codes, Selection, Documentation
- **Industrial Electrical Safety**
    - Hazardous Locations