



# EE051:

## Electrical Systems & Equipment:

### *Start-Up, Commissioning & Testing*



## Training Description:

This training course discusses the practical troubleshooting of electrical equipment and control circuits. It helps to increase the knowledge and skills of delegates in improving equipment productivity whilst reducing maintenance costs. This training course focuses on the main issues of troubleshooting electrical equipment and control circuits of today to enable delegates to walk onto their facilities to troubleshoot and fix problems as quickly as possible. The delegates will be able to identify, prevent and fix common electrical equipment and control circuits. The delegates will be aware of practical issues that go beyond typical electrical theory and focus on providing them with the necessary toolbox of skills in solving electrical problems which normally faced at industrial fields.

## Training Objectives:

By the end of the training, participants will be able to:

- ✓ Diagnose electrical problems
- ✓ Eliminate the expensive trial and error approach
- ✓ Reduce unexpected downtime on electrical motors and other equipment
- ✓ Improve plant safety
- ✓ Learn specific techniques to troubleshoot equipment and control circuits
- ✓ Analyze Equipment problems
- ✓ Determine causes of equipment failure

## Training Designed for:

The course is intended for Electrical Supervisors and Electrical Technicians engaged in the maintenance, inspection and testing of Electrical Equipment. The methods and examples are generic, personnel from all industries will benefit. Participants require a good understanding of electricity and magnetism and possess some relevant experience.

## Training Program:

### DAY ONE:

#### PRE-TEST

- ❖ **Basic Electrical Principles**
  - Industrial Electricity
  - Single and Three Phase Power systems
  - Electrical systems and components
  - Fault identification
  - Industrial Earthing System
- ❖ **Devices, Symbols and Control Circuits**
  - Devices and Symbols
  - Language of Control Circuits
  - Reading and understanding electrical drawings



- Control instruments
- Meters used in Troubleshooting
- Power and control circuits
- Electrical control circuits trouble shooting

#### DAY TWO:

##### ❖ USE OF APPROPRIATE INSTRUMENTS

- Instruments for troubleshooting
- Insulation tester (Megger)
- Continuity testers
- Voltage indicator
- Multimeter
- Clamp-on meters
- Ohm-meter and ducter
- Special instruments

##### ❖ Troubleshooting Ac Motors and Motor Starters

- Fundamentals of AC Motors
- Types of ac and dc motors used
- Motor terminal identification and connection diagrams
- Identification and construction
- Motor name plate information
- Ex motors
- Test equipment to check motor operation
- Methods of changing Bearings
- Why motors fail and how to extend life
- Troubleshooting of motors
- Motor case study

#### DAY THREE:

##### ❖ Troubleshooting Power transformers

- Transformers main Component & Functions
- Name plate data & verification
- Accessories & Protective Devices

##### ❖ Transformer General Diagnostic and Testing

- Insulation Resistance and Polarization Index
- Turns Ratio and Excitation Current
- Winding Resistance
- Voltage Measurement
- Frequency Response Analysis
- Interpretation of test results
- Periodic Inspection
- Making Transformer Inspections
- Transformer Liquids
- Dielectric test
- General Testing
- Electrical Tests





- Disassembly and Inspection
- Common Transformer Abnormalities
- Transformer Oil Tests
- Fault Analysis
- Case study

#### DAY FOUR:

##### ❖ Generator Fundamentals, Testing and Trouble Shooting

- Principles of Generators
  - AC Generators
  - Generator excitation and voltage control
  - Diesel generator sets
  - Synchronizing of generators
- Trouble Shooting
  - General Procedure
  - Generator Does Not Produce Voltage
  - Generator Produce Low Voltage
  - Generator Produce High Voltage
  - Generator Voltage Fluctuating
  - Fault analysis for Generator Control Circuit
- Typical practical case study and Root cause analysis

#### DAY FIVE:

##### ❖ UPS, Rectifiers, Inverters and Batteries Fundamentals Maintenance, Testing and Troubleshooting

- UPS Fundamentals
- Rectifications & Inverters
- ❖ Inverters
- ❖ Batteries and Battery Charging
- ❖ Battery Charging Tests
- ❖ Safety during Battery Charging
- ❖ Mixing Electrolyte
  - Battery discharge test.
  - Troubleshooting Guide
- ❖ Typical practical case study and Root cause analysis

#### Course Conclusion

#### POST-TEST and EVALUATION

### Training Requirements:

“Hands-on practical sessions, equipment and software will be applied during the course if required and as per the client’s request”.

Please note that the above topics can be amended as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.





## Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

## Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

## Training Fees:

**As per the course location** - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01<sup>st</sup> of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

## Training Timings:

### Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

### For training registrations or in-house enquiries, please contact:

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Training & Career Development Department

