1. Course Details:

Course Code : EPET-010
Course Title : Maintenance/Troubleshooting of UPS Systems and Battery Power Supplies
Course Duration : 5 Days

2. Course Overview:

- Where a company regards electrical power as critical then there will be a need for a continuous or back up power system. The installation of a UPS will provide the necessary continuity. There are however problems with these installations when there is a need for maintenance especially the use of by-pass. Power Quality compatibility problems may cause failure, which was the reason for the original UPS installation.

3. Learning Outcomes:

- Understand the Basic Building Blocks Common to all UPS Systems
- Have a knowledge of the Construction and Operation of the Major Types of Industrial UPS Systems
- Understand how to Maintain and Perform Test Lead-Acid and Ni-cad Battery Systems
- Be able to Identify the Hazards and Safe Work Practices Related to UPS Systems and its Batteries
- Have learned basic troubleshooting techniques for UPS systems
- Be able to implement preventive maintenance for UPS battery and battery charger, and annual testing

4. Course Contents:

Ups System Overview & Power Quality Basics

- Rectifier
- Inverter
- Static switch
- Manual bypass switch
- What constitutes power quality?
- Sags and swells
- Voltage fluctuations and mitigation
- Interruptions
- Surges - their causes, effects and remedies
- Noise and harmonics

Battery Chargers

- UPS charging limitations
- AC Ripple current
- Equalize charge
- UPS efficiency and power factor
- Battery sizing calculation
- Adjusted battery load calculation
- Voltage windows and number of cells
- Cell selection

Basics of Batteries

- Types of batteries: primary and secondary
- General features of lead-acid and nickel -cadmium batteries
- Comparison of the chemistry involved
- Lead acid batteries - subtypes, construction and relative features
- Manufacture of batteries

Charging and Discharging of Batteries

- Float charging and boost (equalizing) charging
- Facts about charging of lead acid batteries
- Internal loss and the factors that affect it
- Current during charging cycle - variants
- Overcharging and undercharging
- Sulphation and hydration
- The discharge processes
- Specifics about charging of UPS batteries
- Nickel cadmium batteries
- Charging strategy for nickel cadmium batteries

Battery Upkeep, Failures and Disposal

- Need for upkeep and monitoring
- Causes of failures and failure modes
- Periodic inspection and residual life assessment
- Test equipment and safety of personnel
- Predictive monitoring by conductance testing
- Disposal and recycling

Battery and Battery Charger Preventative Maintenance

- Comprehensive maintenance for your VRLA or flooded batteries
- Measure of cell voltage levels
- Visual inspection for leaks or bad cells
- Spot check for connection torques
- Load testing
- Inspection of battery environment
- Detailed report of battery test and inspection results and recommendations for corrective actions
- Preventive maintenance and recommendation of battery chargers

Ups System Troubleshooting and Maintenance

- Critically apply the manufacturer's recommendations
- Basic use of test equipment and tools
- Rectifier and battery charger troubleshooting

5. Our Methodology:

- Make coaching and monitoring innovative and using modern
- Media training also using on the go training by using interactive means and focusing on
- The exercises, practical applications and real situations study.
- Live delivery method, instructor-led training.
- Experienced consultant, trainers, and professional.
- Qualified trainer with high-level experience

6. Attendance Reports:

- Send daily attendance reports to trainingdep
- Send full attendance report to training dep. by the end of thecourse
- Attend 100 % from the course days also providedaily
- Issue attendance certificate for participant who attend minimum 80% from the course duration

7. Pre/Post Reports:

- Pre- assessment before starting training.
- Post assessment after finish training
- Full report for the deferent between Pre-& Post assessment

8. Who Should Attend?

- Maintenance Technicians
- Maintenance Supervisors
- Plant Engineers
- Operators