AMERICAN GLOBAL INSTITUTE FOR PRIVATE TRAINING

External Training Course

Fundamentals of Electrical and Instrument Maintenance

From 06 Oct. To 10 Oct. 2025
From 24 Nov. To 28 Nov. 2025
From 15 Dec. To 19 Dec. 2025

Hotel Ambit Barcelona, Spain

Mr. Ghanem F. Al-Otaibi
GM & Institute Owner
Tel.: 00965 22248901 **Fax: 00965 22204999**
Mob.: 00965 65548855 **Mob.: 00965 97273712**
Email: admin@agi-kw.com **Email: agi-kw@hotmail.com**
W/SITE: WWW.AGI-KW.COM

American Global
Institute For Private Training

Tel. 00965 - 22248901
Mob. 00965 - 65548855
Email admin@agi-kw.com
W/Site www.agi-kw.com

External Training Course:

Fundamentals of Electrical and Instrument Maintenance

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Course Overview:

This intensive 5-day training program provides a solid foundation in the principles, practices, and standards of electrical and instrument maintenance. Participants will gain hands-on knowledge of maintaining, troubleshooting, and optimizing electrical systems and instrumentation used in industrial operations. The course blends theory and practical insight, enabling attendees to ensure operational reliability, enhance equipment safety, and minimize downtime in plant and field environments.

Course Objectives:

By the end of this course, participants will be able to:

- Understand the core principles of electrical systems and instrumentation.
- Identify and interpret electrical drawings, P&IDs, and instrument loop diagrams.
- Apply best practices for the inspection, testing, and calibration of instruments and electrical components.
- Troubleshoot faults in electrical circuits and instrument control systems effectively.
- Implement preventive and predictive maintenance techniques to increase system reliability.
- Follow international standards (e.g., IEC, ISA, NEC) for safe maintenance practices.

Target Audience:

This course is designed for:

- Electrical Technicians & Staff.
- Instrument Technicians & Coordinators.
- Maintenance and Reliability Engineers.
- Field Operators and Technical Support Staff.
- New Graduates and Trainees in the Electrical/Instrumentation Field.
- Anyone involved in the operation or maintenance of electrical and instrumentation systems.

Organizational Impact:

Improved operational reliability and reduced maintenance costs.
Fewer unscheduled shutdowns due to effective troubleshooting.
Higher safety compliance and adherence to international standards.
Enhanced workforce skills, enabling faster and more accurate maintenance.
Strengthened preventative and predictive maintenance culture.

Personal Impact:

Gain essential knowledge and skills to become proficient in E&I maintenance.
Develop troubleshooting confidence and decision-making ability.
Improve career growth opportunities through technical expertise.
Learn from real-life case studies and practical exercises.

Course Outline:

Day 1: Electrical Systems Fundamentals

- Overview of industrial power systems (AC/DC).
- Electrical safety standards and lock-out/tag-out procedures.
- Circuit components, protection devices, and grounding.
- Single-line diagrams and electrical schematics.

Day 2: Instrumentation Basics

- Introduction to process measurement (pressure, flow, temperature, level).
- Sensors, transmitters, and control devices.
- Loop drawings, P&ID interpretation.
- Instrument classification and identification (tagging).

Day 3: Maintenance Planning & Best Practices

- Maintenance types: preventive, predictive, corrective.
- Maintenance planning and scheduling.
- Documentation and work order systems (CMMS).
- Tools and test equipment selection and usage.

Day 4: Troubleshooting and Calibration Techniques

- Fault-finding in electrical and instrument loops.
- Voltage, current, resistance measurements.
- Calibration procedures (manual and automated).
- Use of multimeters, calibrators, loop testers.

Day 5: Reliability, Safety, and Standards

- Root Cause Analysis (RCA) and Failure Mode Analysis (FMEA).
- Safety Instrumented Systems (SIS) and SIL levels.
- International codes and practices (IEC, NEC, ISA).
- Final workshop: Case studies and troubleshooting exercises.

Course Agenda:

(1st Day) Agenda

8.30	9.00	Opening Remarks (30 Min.).
9.00	11.30	Discussing Course Main Topics: • Electrical Systems Fundamentals. • Instrumentation Basics. • Maintenance Planning & Best Practices. • Troubleshooting and Calibration Techniques. • Reliability, Safety, and Standards.
11.30	12.00	Coffee Break
12.00	14.00	Electrical Systems Fundamentals • Overview of industrial power systems (AC/DC). • Electrical safety standards and lock-out/tag-out procedures. • Circuit components, protection devices, and grounding. • Single-line diagrams and electrical schematics.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(2nd Day) Agenda

9.00	11.30	Instrumentation Basics: • Introduction to process measurement (pressure, flow, temperature, level). • Sensors, transmitters, and control devices.
11.30	12.00	Coffee Break
12.00	14.00	Instrumentation Basics: • Loop drawings, P&ID interpretation. • Instrument classification and identification (tagging).
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(3rd Day) Agenda

9.00	11.30	Maintenance Planning & Best Practices: • Maintenance types: preventive, predictive, corrective. • Maintenance planning and scheduling.
11.30	12.00	Coffee Break
12.00	14.00	Maintenance Planning & Best Practices: • Documentation and work order systems (CMMS). • Tools and test equipment selection and usage.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(4th Day) Agenda

9.00	11.30	Troubleshooting and Calibration Techniques: • Fault-finding in electrical and instrument loops. • Voltage, current, resistance measurements.
11.30	12.00	Coffee Break
12.00	14.00	Troubleshooting and Calibration Techniques: • Calibration procedures (manual and automated). • Use of multimeters, calibrators, loop testers.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(5th Day) Agenda

9.00	11.30	Reliability, Safety, and Standards: • Root Cause Analysis (RCA) and Failure Mode Analysis (FMEA). • Safety Instrumented Systems (SIS) and SIL levels.
11.30	12.00	Coffee Break
12.00	14.00	Reliability, Safety, and Standards: • International codes and practices (IEC, NEC, ISA). • Final workshop: Case studies and troubleshooting exercises.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch