€TRAINING

Industrial Instrumentation and Modern Control Systems

Industrial Instrumentation and Modern Control Systems

Introduction:

This training program focuses on equipping participants with essential knowledge and skills in industrial instrumentation and advanced control systems. It emphasizes the principles, technologies, and applications necessary for effective control and automation in industrial settings.

Program Objectives:

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

- Understand the fundamentals of industrial instrumentation and control systems.
- Gain proficiency in selecting, installing, and maintaining industrial instruments.
- Learn principles and techniques of modern control systems and automation.
- Apply advanced control strategies to enhance operational efficiency and productivity.
- Develop troubleshooting skills for diagnosing and resolving instrumentation and control system issues.

Program Outlines:

Unit 1:

Introduction to Industrial Instrumentation:

- Importance and Scope of Industrial Instrumentation.
- Types of Industrial Instruments: Sensors, Transmitters, and Actuators.
- Principles of Measurement: Accuracy, Range, and Calibration.
- Signal Conditioning and Transmission.
- Overview of Control Loops and Feedback Systems.

Unit 2:

Sensors and Transducers:

- Types and Principles of Sensors: Temperature, Pressure, Flow, and Level Sensors.
- Selection Criteria for Sensors in Industrial Applications.

- Installation and Calibration of Sensors.
- Signal Processing Techniques for Sensor Outputs.
- Troubleshooting Common Sensor Issues.

Unit 3:

Control Systems Basics:

- Fundamentals of Control Systems: Open Loop vs. Closed Loop.
- PID Control Principles and Tuning Methods.
- PLC Programmable Logic Controller Basics.
- SCADA Supervisory Control and Data Acquisition Systems Overview.
- Integration of Control Systems with Industrial Networks.

Unit 4:

Advanced Control Strategies:

- Model Predictive Control MPC and Adaptive Control.
- Distributed Control Systems DCS and their Applications.
- Industrial Networking Protocols Modbus, Profibus.
- Safety Instrumented Systems SIS and Emergency Shutdown Systems ESD.
- Real-time Data Acquisition and Processing.

Unit 5:

Instrumentation Maintenance and Troubleshooting:

- Preventive Maintenance Strategies for Industrial Instruments.
- Troubleshooting Techniques for Instrumentation Systems.
- Root Cause Analysis RCA for Instrumentation Failures.
- Calibration and Performance Verification.
- Documentation and Reporting in Instrumentation Maintenance.