Distributed Control Systems

Course Description:
This course provides a comprehensive exploration of Distributed Control Systems (DCS) within the context of industrial process control, offering hands-on insights into system architecture, configuration, operation, and maintenance. Emphasizing both foundational and advanced DCS principles, participants will develop an understanding of sensors, control algorithms, human-machine interfaces (HMI), network communication standards, and maintenance troubleshooting. The course also introduces the latest trends in DCS, including integration with the Internet of Things (IoT) and cloud processing for real-time remote monitoring.

Audience Profile:
This course is designed for engineers, technicians, and professionals working in process control, automation, and instrumentation fields. It is also beneficial for those involved in DCS operation, maintenance, and system integration within industries such as oil & gas, manufacturing, and chemical processing.

Prerequisites:
Participants should have a fundamental understanding of process control principles and basic knowledge of industrial control systems, including sensors, instrumentation, and PLCs.

Course Objectives:
Upon completion of this course, participants will be able to:

- Understand and apply core process control algorithms, including PID control.

- Identify and analyze the structure, configuration, and functions of DCS.

- Set up and configure DCS components for various industrial processes.

- Operate and troubleshoot DCS systems, ensuring optimal functionality.

- Apply alarm management, record logging, and trend analysis within DCS environments.

- Leverage advanced control methods and understand modern DCS integration with IoT and cloud-based systems.

Table of Contents (TOC):

- o   DCS Operator Stations and Interface Categories

- o   Recorders, Loggers, Trend Displays, and Data Archiving

- o   HMI for Control Room and Field Devices

- o   Alarm Management: Requirements and Functions

- o   Alarm Philosophy, Control, and Management

- o   DCS Operation and Operator Role

- o   Integration and Optimization of DCS

- o   DCS Configuration and Integration Techniques

- **Day 4: Maintenance and Troubleshooting**

  - o   Maintenance Considerations and Requirements for DCS Systems

  - o   Control Loop Calibration Procedures

  - o   Tools and Equipment for Troubleshooting

  - o   Troubleshooting Methods for Communication Malfunctions and Faults

  - o   Diagnostics through DCS Modules, Programs, and Internal Variables

  - o   Communication Fault Diagnostics

- **Day 5: Advanced Process Controllers**

  - o   Advanced Control Methods: Feedforward, Cascade, and Statistical Process Control

  - o   Basics of Advanced Process Control and Optimization

  - o   Latest Trends in DCS: Field Monitoring, Industrial Internet, IoT, Mobile Devices

  - o   Cloud Processing: Monitoring and Control in the Cloud