

Training
Course

**Distributed Control System Operation
(Advanced)**



Course Plan

Introduction

Recent trends in globalization, mobile devices, remote operations, and system integration are blurring the lines between distributed control systems (DCS) and supervisory control and data acquisition (SCADA). To complicate matters, some vendors position their products either as DCS or SCADA depending upon the actual application. This course has been designed with these recent trends in mind while covering the most important components of a DCS in detail. Emphasis is placed on DCS operation, networking, HMI, and Alarms. Topics of importance to field Engineers and Operators such as Maintenance and Troubleshooting are covered. Finally, state of the art advanced process controllers and latest trends are also covered.

- DCS Organization and operation
- Networking, HMI, and Alarms
- Maintenance and Troubleshooting
- Advanced Process Controllers
- Latest trends



Course Objectives

- ✓ To review sensors, instrumentation, and process control
- ✓ To cover DCS Organization and operation
- ✓ To know start-up, shut down and emergency handling through DCS operation
- ✓ To Identify Pre-start-up instrument
- ✓ To highlight Start up and stabilization of plant through DCS operation after turn around, normal/emergency shut downs
- ✓ To summarize the most important Networking, HMI, and Alarm features of DCSs
- ✓ To highlight Maintenance and Troubleshooting procedures and issues
- ✓ To review Advanced Process Controllers in DCSs
- ✓ To cover Latest trends related to DCSs
- ✓ To Cover MAXIMO system
- ✓ To have skills of Trouble shooting equipment/process problems

Who should attend?

- This course is intended for managers, engineers, and technicians requiring knowledge of sensors, instrumentation, control, and automation in a distributed control environment.
- A section on maintenance and troubleshooting methods is also included. Personnel in operations will also find this an invaluable course.



Training Methods:

- ✓ Online Video material.
- ✓ Presentation.
- ✓ Live Interactive sessions.
- ✓ Course presenter will make extensive use of all tools that will be needed for the virtual environment.
- ✓ Questions & Answers

Course Outline:

Day One

Review of Process Control and Introduction to DCS

- Review of sensors, instrumentation, and process control systems
- Control Algorithms
 - Proportional (P)
 - Proportional and Integral (PI)
 - Proportional, Integral, and Derivative (PID)
- Distributed Control Systems: Introduction
- Overview, Features, Advantages, Where used
- Functions, Architecture, I/O, components,
- Hardware, software, system interfacing
- Programmable Logic Controller (PLC) – brief overview

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- supervisory control and direct digital control
- Supervisory Control and Data Acquisition (SCADA) – brief overview
- DCS, PLC and SCADA compared
- Pre-start-up instrument checks-Stroking control valves, Control loop check, IPF loop checks.
- Start-up and stabilization of plant through DCS operation after turn around, normal/emergency shut downs.

Day Two

DCS Configuration and Networking

- Distributed Control Systems: Structure and Configuration
- DCS block diagrams, components, architecture, redundancy concepts
- DCS hardware configuration
- DCS Hardware & Software Internals
 - Process variables, software variables, tags
 - Human Machine Interface (HMI)
 - Alarms, Trends
 - Databases
- Basic DCS Controller Configuration
- Sequential Controllers for Batch Processing
- Controllers for Continuous Processes: Function Blocks
- Hierarchical Structure of control systems: ISA-95
- Data Communications and Networking
- Signal Transmission
- Physical Network Structures

- Logical Network Structures
- Communication Standards
- Fieldbus Operation: Foundation Fieldbus, Profibus
- Wide Area Network (WAN) communications: Modbus
- Control in the Field (CIF)
- DCS applications and case study (Oil & Gas)
- Pre-start-up instrument checks-Stroking control valves, Control loop check, IPF loop checks.
- Start-up and stabilization of plant through DCS operation after turn around, normal/emergency shut downs.

Day Three

HMI, Alarms, and DCS Operation

- Human Machine Interfaces: Introduction, features, requirements
- Plant mimic and animation
- DCS Operator Stations
- Interface Categories
- Recorders, Loggers, Trend Displays, and Data Archiving
- HMI in the Control Room and in the Field: Mobile and remote devices
- Alarm Management
 - Key Requirements
 - Alarm System Functions
- Alarms philosophy, control & Management
- Development and Applications, Logs, trends and reports
- DCS Operation
- Operational view of DCS
- Role of operators

- Integration and Optimization of DCSs
- DCS Configuration
- DCS Integration
- Pre-start-up instrument checks-Stroking control valves, Control loop check, IPF loop checks.
- Start-up and stabilization of plant through DCS operation after turn around, normal/emergency shut downs.

Day Four

Maintenance and Troubleshooting

- Maintenance Considerations
- Maintenance Requirements: System and Components
- Procedure for Checking Control Loop Calibration
- Identify proper tools and test equipment for troubleshooting

Troubleshooting

- Proper troubleshooting methods
- Identify typical communication malfunctions and faults
- Identifying failures, malfunctions, and faults
- Diagnostics through DCS Modules, and Programs (code)
- Diagnostics through Internal Variables and Bits of DCS
- Diagnostics of Communication faults
- Generate Maximo work requests and unit monthly production reports.
- CMMS MAXIMO explanation

Day Five

- Advanced Process Controllers
 - Feed forward Control
 - Cascade Control
 - Statistical Process Control
- Basics of advanced process control and optimization
- Latest DCS Trends
 - Monitoring and control in the Field
 - Industrial Internet
 - Internet of Things
 - Mobile and remote devices
- Cloud Processing
 - Monitoring and control in the Cloud

Training Details

Course Duration	5 Days
Pre-Schedule	11-15 November 2024
Venue	Parkcentraal - Holland , Amsterdam
Training Fees Per Person	KWD 1500 (One Thousand Five Hundred Only)
Course Fees Include	<ul style="list-style-type: none"> ✓ Tuition documentation ✓ Curriculum and Training Handout ✓ Five star Lunch ✓ Completion Certificates

