



Global Professionals Institute for Training  
معهد المحترفون العالميون للتدريب الأهلي

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## Distributed Control System Operation (Advanced)



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## Course Description:

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



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## 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



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## 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.

## Program Syllabus

### First Day

- ❖ 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,



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- ❖ Hardware, software, system interfacing
- ❖ Programmable Logic Controller (PLC) – brief overview
- ❖ 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.

## Second Day

- ❖ 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)



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- ❖ 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.



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- ❖ 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



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## Fourth Day

- ❖ 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 internal Variables and Bits of DCS
- ❖ Diagnostics of Communication faults
- ❖ Generate Maximo work requests and unit monthly production reports.
- ❖ CMMS MAXIMO explanation



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## ❖ 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



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## Program Methodology

A highly interactive combination of lecture and discussion sessions will be managed to maximize the amount and quality of information, knowledge and experience transfer. The sessions will start by raising the most relevant questions, and motivate everybody finding the right answers. The attendants will also be encouraged to raise more of their own questions and to share developing the right answers using their own analysis and experience. Course material through power point equipped with necessary animation, learning videos, and general discussion to provide participants with full understanding concerning the subject course will be provided.

## Percentage of Delivery Methodologies

50% Presentation

20% Group & Individual Exercises

20% Case Studies

10% Active Movies and Videos

## العرض المالي

السعر	مكان الانعقاد	تايخ الانعقاد	مدة البرنامج
1450 kd	Malaysia – kuala lumpur - Grand Millennium Kuala Lumpur	15-19 December/ 2024	5 days

## تفاصيل التكلفة :

- المحاضرة العلمية ❖
- المادة العلمية ❖
- الشهادات ❖
- بوفيه خفيف ❖



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