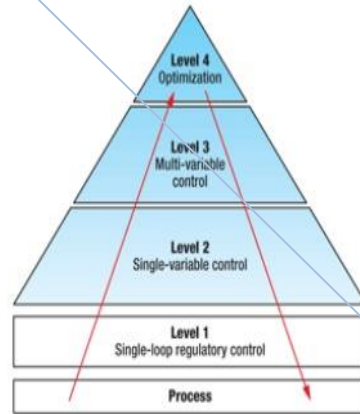


Advanced Process Control (APC)

Advanced control is one of the most important ways in which the production situation can be improved, and model-based control offers a very direct and feasible solution for an appropriate operation.



Training Course :

Advanced Process Control

Training Course For One Week In

**Lebanon , Beirut , Four Seasons
Hotel Beirut**

Which Be Held As Under Details :



Abar Solutions Petroleum Consultancy Invite Your Employee To Participate With Us In Special Training Course As Under Details :

Course Name		Advanced Process Control			
Code	Period	Language	Start	End	Location
ICT 001	5 Days	Bilingual (Arabic & English)	13/08/2017	17/08/2017	Lebanon , Beirut , Four Seasons Hotel Beirut
			03/09/2017	07/09/2017	
			08/10/2017	12/10/2017	
			12/11/2017	16/11/2017	
			10/12/2017	14/12/2017	
			14/01/2018	18/01/2018	
			11/02/2018	15/02/2018	
			11/03/2018	15/03/2018	
			15/04/2018	19/04/2018	
			20/05/2018	24/05/2018	
			10/06/2018	14/06/2018	
22/07/2018	26/07/2018				

**** The Fees Includes : Lecturer , Training Material , Training Room With One Coffee Break Daily , Certificate Of Attendance In Last Day Training Course ****

Course Description

⇒ Advanced Process Control and Loop Tuning and Analysis is designed to provide engineers and technicians with the basic theoretical and practical understanding of the process loop and how this can be applied to optimize process control in terms of quality, safety, flexibility and costs.

Course Objectives

- ⇒ **After completion of this course you will understand the:**
- Fundamentals of process control
 - The effect of P.I.D tuning

- Recognize different control algorithm
- Understand cascade and feed forward control
- Lead lage and ratio control
- How to decouple the interacting loop
- Appreciate the effects of different valve characteristics on the loop performance
- Analyze such problems as valve hysteresis, stiction and non linearities
- Fully appreciate the effects of proportional, integral and derivative control
- Correctly apply both open and closed Loop Tuning according to Ziegler Nichols
- Understand cascade and feedforward control
- Appreciate the rationale for using Ratio control and Adaptive control systems

Course Content & Outlines

⇒ **Day 1**

⇒ **Introduction**

- Control objective
- Closed control loop
- Control strategies
- Feedback control
- Feedforward control

⇒ **Basic components control system**

- Sensor and transmitters
- Controller , action of controllers
- Final control element
- Control valve gain
- Windup reset control

⇒ **Process control fundamental**

- ON/OFF control
- Proportional control
- Proportional band vs. proportional gain
- Proportional offset
- Reset

- Integral action
- Integral windup
- Stability
- Derivative action
- PID control
- Load disturbances and offset

⇒ **Day 2**

⇒ **Advanced control Algorithm**

- Feedforward control
- Cascade Control loop
- Self tuning
- Ratio control
- Split range control

⇒ **Loop tuning**

- Basic principles
- Open loop reaction curve method (Ziegler – Nichols)
- Default and typical settings
- Closed loop continuous cycling method (Ziegler – Nichols)
- Override and selective control
- Ratio and feed forward control

⇒ **Day 3**

⇒ **Control Algorithm**

- Stability consideration
- Two level cascade
- Three level cascade
- Fine tuning
- Tuning for load rejection vs. set-point rejection
- Tuning for different vs. robustness
- Surge control

⇒ **Elements of advanced control loop**

- Smart transmitter it ,advantage
- Final control elements with smart positioned
- Microprocessor or based controller
- Organization of control element to have a feed back control system
- Disadvantage of feed back control system
- How to overcome the disadvantage of feed back control system

⇒ **Day 4**

⇒ **Advanced control algoritms**

- Why we choose the advanced control system
- Stage of development of advanced control system
- Difference between feedback & feed forward control system
- Cascade control system
- Feedforward control system
- Ratio control system
- How to compine the advantage of feedback and feedforward
- Adaptive and self tuning control loops
- Multi variable controls
- Interacting loops (severity of interaction)
- Relative gain array calculation
- Decoupling interactive multivariable control loops
- Stastical analysis

⇒ **Day 5**

⇒ **Final control element**

- Pressure recovery
- Flashing and caviations
- Valve construction
- Valve characteristics
- Inherent
- Installed
- Caviations control

- Actuators
 - Diaphragm
 - Cylinder
 - Electric
 - Valve positioners
 - Deadband and hysteresis
 - Stick-slip
 - Testing procedures and analysis
 - Effect of valve performance on controllability
- ⇒ **Digital control system**
- Communication fundamental
 - Migration to experion
 - Introduction to fielbus , profibus
- ⇒ **Application of control system**
- ⇒ **Case studies**
- ⇒ **Boiler control**
- Level drum control
 - Single element
 - Two element
 - Three element
- ⇒ **Ratio control**
- Series limited control
 - Parallel limited control
 - Lead lag firing
- ⇒ **Fractionator control**
- The reflux rate
 - The reboiler heat input
 - The fractionators pressure
 - The feed rate
 - The feed temperature