

Measurement and Automatic Process Control

COURSE DESCRIPTION

Automatic Process Control is being used in almost all the industry verticals today. Oil and Gas industry has special emphasis on process control for improvement in safety, quality, efficiency and productivity with reduction in material wastage and energy consumption.

This is an introductory course, which aims to build a good understanding about the basics of automatic process control. It covers details of sensors/transducers used for measurement of process parameters, the control loop components and focuses on providing inputs related to process control strategies.

The course covers transducer characteristics, working principle, specifications, design and selection aspects of instruments used for sensing various process parameters along with merits and limitations of each type of sensor. The course would also build the knowledge of the participants related to basics of process control, working principles of control loop components, the control strategies, and the PID controller fundamentals including the terminology, algorithms and tuning methods. A special emphasis on real life implementations, case studies and international standards would ensure participants to co-relate the theory with their day-to-day practice. A brief introduction to multivariable control would help the participants to enhance their exposure related to complex control.

COURSE OBJECTIVES

Upon Completion of this course the participant will be able to

- Understand transducer/ sensor fundamentals
- Learn various sensors and transducers used for measurement of process parameters such as temperature, flow, pressure, level etc. covering principle of operation, specifications etc.
- Have knowledge on sensor Design and Selection
- Understand working of Control Loop Components
- Understand concepts of open and closed loop control, feedback control
- Gain knowledge on PID control strategy and its real life implementation
- Know the art of PID controller tuning
- Have a brief exposure to multivariable control

WHO SHOULD ATTEND

Instrumentation, Electrical, Mechanical and Process Engineers, Project Engineers, Maintenance engineers and supervisors interested to acquire the knowledge in the field of measurement and process control. The course will definitely be beneficial for the all the other department people concerned with the plant operations, maintenance and safety. It could be also useful for the procurement and quality personnel.

Training Methodology

Training will be delivered mainly through lectures with emphasis on practical examples and case studies. Experienced instructor is provided to guide the participant using demonstrations and assignments so that they are prepared to work confidently in the field of Process Control.

THE INSTRUCTOR

Mr. Sudhir Panditrao

The faculty for this course, Mr. Sudhir Panditrao has done his graduation and masters in instrumentation engineering with specialization in process instrumentation.

During his professional career spanning 22 years, Mr. Panditrao has worked in the areas of instrumentation and automation design, detailed engineering, projects, installation and commissioning at site for variety of industry applications. He has also worked as a director for process control and computer peripherals manufacturing company mainly supplying to major automation manufactures. He has experience of working in the Middle East as a profit center head that included international projects, sales and marketing in instrumentation and industrial packaging. He has worked as a consultant to various leading international organizations.

Mr. Panditrao has carried out training in the areas of instrumentation, industrial automation, PLC, DCS, SCADA, advanced process control, automation project engineering etc. for many professionals, students and professors from several leading companies, engineering colleges and institutes.

He has worked as an Asst. Professor with one of the leading technical institutes and has published many papers. He is associated with number of institutes as a visiting faculty and is a member of board of studies and postgraduate recognized teacher at University. He has presented a paper at IEEE Conference on Advance Process Control at Vancouver, Canada in May 2005.

Having worked in both industrial and academic worlds Mr. Panditrao has a unique proposition to conduct training for industry professionals.

COURSE OUTLINE

Module 1

Background and Evolution of Process Control/ Automation
Basic Concepts - Open /Close loop
Introduction to Control Loop Components
Continuous and Discrete Control
Current Scenario - PLC and DCS based automation
Sensors and Transducer and its Characteristics
Principle of working, specifications, merits and limitations, selection criteria for following sensors:
Temperature Measurement

Module 2

Principle of working, specifications, merits and limitations, selection criteria for following sensors:
Pressure Measurement
Flow Measurement

Module 3

Principle of working, specifications, merits and limitations, selection criteria for following sensors:
Level Measurement
Position Sensing
Weight Measurement
Speed Measurement
Process Parameter Switches: Pressure, Level, Flow, and Temperature

Module 4

Control Loop Components
Standard Signals
SMART Transmitter
I to P Converter
Control Valves
Actuators and Positioners
Solenoid Valves
Process Characteristics, Lags in Control loop
Controllers and Control Actions
ON-OFF
Proportional, Integral, Derivative

Module 5

PID Controllers
Algorithms, forms, terminology, selection
Microprocessor based Controllers
SLPC
Tuning of Controllers
Introduction to Multi Variable Control
Cascade Control
Ration Control
Selective Control
Feed forward Control