

Process Control Techniques

Program Description

This course explains process control concepts, starting with the basic feedback control, and extending through an overview of advanced control topics such as ratio, cascade, feedforward, override, decoupling and model-based control, including model predictive control.

The emphasis will be on how to select and incorporate the various techniques into an overall process control system which will achieve stable plant operation and minimum variability in product quality.

This is a practical level course. Participants will be using PCs in the classroom to illustrate many of the concepts, including controller tuning and advanced regulatory control techniques.

Program Outline

- ◆ **Process Control Symbols and Terminology**
 - ISA Symbols and P&I diagrams
 - Functional SAMA Symbols
 - Block Diagrams
- ◆ **Process Characteristics - Steady State and Dynamic**
 - Steady State Response
 - Effect of disturbances
 - Dynamic response
 - Process gain
 - Lag
 - Dead time
 - Approximate response
- ◆ **Typical Process Control Loop Characteristics:**
 - Flow loops
 - Temperature loops
 - Pressure loops
 - Level loops
- ◆ **Feedback Control:**
 - Two Position Control
 - Proportional mode
 - Integral mode and PI control
 - Derivative mode, PD, and PID control
- ◆ **Commercial Features of PID:**
 - Configuration options
 - Digital Algorithms
 - Function blocks

◆ **Feedback Controller Tuning Techniques:**

- Tuning criteria
- Trial and error/tuning
- Open loop tuning
- Closed loop tuning
- Practical guideline
- Adaptive tuning

◆ **Advanced Regulatory Control:**

- Ratio
- Cascade
- Feedforward
- Selector
- Decoupling

◆ **Introduction to Model Based Control:**

- Dead time compensation
- Smith predictor
- Internal model control
- Model predictive control

◆ **Application Examples:**

- Heat exchangers
- Heaters
- Distillation,
- Chemical reactors,
- Overall plant control

Who Should Attend

Process engineers interested in acquiring or increasing their knowledge of process control and its potential for improving process operations; control systems engineers interested in increasing their knowledge of the behavior and implementation of advanced control techniques.

This course is a practical level course, rather than a theoretical course, therefore no prior process control courses or experience is required. A familiarity with process characteristics, fundamental measurement techniques and signal transmission principles will be helpful.

For any further information please contact us at:

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