ControlSoft
ADVANCED PROCESS CONTROL MADE EASY

TRAINING

OPEN ENROLLMENT

PID Loop Tuning & Advanced Process Control

Hands-on, instructor-led courses for the engineers and technicians who tune and maintain control loops. Start with PID fundamentals and build up to model-based control or boiler tuning, virtually or in person.

Universal training for any control system. ControlSoft software is used for in-class exercises; this is not product training.



"I've learned more in two days than I've learned in a lot of other longer classes."
Principal Controls Technician,
Power Generation

What you will learn

- Increase operational efficiency with existing assets
- Maintain safe regulatory control environments
- Mitigate the risk of unscheduled downtime
- Reduce operating costs and increase profitability
- Extend hardware asset lifespans
- Improve product consistency

Ways to attend

Virtual Interactive. Live instruction and hands-on exercises from your desk.

In-person Interactive. Classroom training with ControlSoft engineers.

Current dates.
controlsoftinc.com/training

96.5%
of trainees say our training impacted their job positively

93%
of trainees would recommend our training to others

67%
of companies repeat our private training for multiple groups

Up to 30
years of experience per instructor

7.5
continuing-education credits per day

Hands-On
exercises help participants develop skills through active learning and practice

REGISTER
+1 (440) 443-3900
training@controlsoftinc.com
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COURSE CONTENT

Four modules. Two learning paths.

01 PID Controller Tuning

02 APC Techniques

03 Model-Based Control

04 Power Gen & Boiler Tuning

PATH A · 3 DAYS
01 → 02 → 03

PATH B · 4 DAYS
01 → 02 → 04

PRIVATE TRAINING

Five or more on your team?

We deliver any course on location or virtually, on your schedule, with application-specific content for your plant.

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01 PID Controller Tuning — 7.5 HRS

Prerequisite: none

The fundamentals of PID control, its variations, and how to evaluate the health and tuning of a PID loop.

1. Process modeling and control
2. Fundamentals of PID control
3. Control and tuning objectives
4. Tuning techniques and practices
5. Industrial PID equation types
6. Adaptive tuning and advanced topics

Applications: temperature, pressure, flow, level, speed, position, composition, high-order process

02 Advanced Process Control Techniques — 7.5 HRS

Prerequisite: Module 01

Control strategies beyond PID, with design, tuning and common implementation pitfalls.

1. Enhanced PID: anti-reset windup, tracking, bumpless transfer
2. Cascade control
3. Feedforward control
4. Split range control
5. Gain scheduling and multiple PID
6. Override control

Applications: non-linear processes, reducing disturbance impact, speed, position, composition, high-order process

03 Model-Based Control Techniques — 7.5 HRS · ADD-ON

Prerequisite: Modules 01 and 02

Model-based control theory and practice, and how to design, tune and evaluate the applications best suited to it.

1. Model-based control overview
2. Smith predictor
3. Internal model control (IMC)
4. Coordinated control (CC)
5. Modular multivariable control (MMC)
6. Predictive control

Applications: long deadtime processes, multi-output control, interacting processes

04 Power Gen & Boiler Tuning — 15 HRS · ADD-ON

Prerequisite: Modules 01 and 02

The critical boiler control loops and methods, with the design, tuning and implementation pitfalls that make boiler tuning so challenging.

1. Boiler control
2. Load demand control
3. Boiler-following mode
4. Turbine-following mode
5. Coordinated control
6. Main boiler control loops
7. Trim control principles and uses
8. Function generator characterization
9. SH/RH steam temperature control
10. Feedwater flow control
11. Drum level control
12. Pollution controls (NOx, SOx, opacity)
13. SCR ammonia injection / NOx tuning
14. Combustion control
15. Fuel flow control
16. Air flow control
17. Excess O2 control
18. Furnace pressure control
19. Unit master (MW and throttle pressure)

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