

# PID Loop Tuning & Advanced Process Control Techniques

Learn best practices to optimize control systems for peak performance.



## Overview

Designed for engineers and technicians, classes cover fundamentals of process control as well as advanced process control techniques using our award-winning control solutions. Learn how to:

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

This is universal PID loop tuning and advanced strategy training. The skills you learn will benefit you regardless of your control system. Software is used for simulation exercises during class, but this is not product training.

## ControlSoft At-a-Glance

- 36 years in business (since 1985)
- Expert team of PhDs and advanced degree engineers, some with 20-30 years field experience in plants worldwide
- Numerous patents and multiple industry awards for technology, service and growth over the past three decades



## Course Options

*Our modular course covers basic terminology and the building blocks of process control and advanced process control techniques.*

- Day 1 - PID Controller Tuning
- Day 2 - Advanced Process Control Techniques
- Day 3 - Model-based Control Techniques «Add-on»
- Day 4 - Boilers and Power Generation «Add-on»

You can register for the course as follows based on your needs:

- Day 1
- Day 1 and Day 2
- Day 1 and Day 2 *plus* Day 3 or Day 4
- Day 1 and Day 2 *and* Day 3 *and* Day 4



## Private On-site Training Available

Help your team become more productive by bringing ControlSoft to your facility. Courses are delivered to your employees, at your location, on your schedule. Each on-site course is designed to meet your needs, and can be customized to include application-specific content if desired.

# Course Agenda

## DAY 1: PID Controller Tuning

Learn the fundamentals of PID control, its variations, and things that are important to know in evaluating the health and tuning of PID loops, as well as how to tune a PID controller.

Topics	Applications	
1. Understanding Process Modeling and Control	• Temperature	• Speed
2. Fundamentals of PID Control	• Pressure	• Position
3. Control and Tuning Objectives	• Flow	• Composition
4. Tuning Techniques and Practices	• Level	• High-order Process
5. Industrial PID Equation Types		
6. Adaptive Tuning and Advanced Topics		

## DAY 2: Advanced Process Control Techniques

Learn the best practices and techniques for process control strategies beyond PID control, as well as design, tuning, and common implementation pitfalls.

Topics	Applications	
1. Enhanced PID Control: Anti-reset Windup, Tracking mode, Bumpless transfer	• Controlling Non-linear Process	• Speed
2. Cascade Control	• Reducing Impact of Disturbances	• Position
3. Feedforward Control		• Composition
4. Split Range Control		• High-order Process
5. Gain Scheduling and Multiple PID		
6. Override Control		

## DAY 3: Model-based Control Techniques <<Add-on>>

Learn about model-based control theory and practice, including the design, tuning, and evaluation of applications best suited for model-based control.

Topics	Applications
1. Model Based Control Overview	• Long Deadtime Processes
2. Smith Predictor	• Multi-Output Control
3. Internal Model Control (IMC)	• Control of Interacting Processes
4. Coordinated Control (CC)	
5. Modular Multivariable Control (MMC)	
6. Predictive Control	

## DAY 4: Boilers & Power Generation Processes <<Add-on>>

Learn about critical boiler control loops and control methods, as well as design, tuning, and common implementation pitfalls that often make proper boiler tuning so challenging.

Topics	Applications
1. Boiler Control	6. Trim Control Principles and Uses
2. Load Demand Control	7. Function Generators Characterization
3. Boiler-Following Mode	8. Tuning Combustion, Boiler and Emission Control Loops
4. Turbine-Following Mode	9. Application of One-shot Cascade Tuning
5. Coordinated Control	10. Specific Tuning Principles and Procedures

## Get Started

To learn more and/or register for a class, visit our website at <https://www.controlsoftinc.com/training/>.