

# Advanced Pipeline Process Control Optimization

Improving Pipeline  
Process Control Performance

Spring/Fall  
Edmonton, AB

## COURSE TOPICS:

Pressure Control Strategies  
Override, Split Ranging, Linearization  
Flow control applications  
Interacting control loops  
Viscosity / Density Control  
Ratio, Cascade, Feedforward  
Lambda Tuning advanced strategies  
Advanced Troubleshooting

Your technical resource for improving  
pipeline process control performance

Pipeline system pressure and flow control applications are somewhat unique. The pipeline control valves may spend much of their time wide open to minimize pumping costs but also need to respond quickly and accurately to sudden pressure excursions to prevent unscheduled line shutdowns. One key to 'good' pipeline control is careful selection and sizing of the process control equipment (sensors, pumps, valves) in order to ensure fast and controllable dynamics. Good control strategy design and a structured, scientific approach to control loop tuning are essential components to achieving performance and variability objectives. The ability to identify and solve process and control problems quickly and reliably requires an analytical troubleshooting approach.

## COURSE DESCRIPTION

The 2 day advanced course builds on the concepts presented in the 2 day basic course. The course begins with a review of advanced strategies for pipeline pressure control (output linearization, split ranging). The applications, benefits and challenges of flow control are the next main topic. Viscosity control (sensors, dynamics, control strategies) and advanced troubleshooting techniques are the final topics. Approximately 40% of the course is devoted to a computer-based lab. The labs focus on developing an understanding of the costs/benefits of advanced strategies, the application of Lambda tuning to these strategies, and on troubleshooting complex control logic.

## INSTRUCTORS

**Doug Nelson, P.Eng.** has over 30 years of industrial process control experience. He has broad expertise in process control training of operators, instrumentation specialists and process control engineers.

**George Jablonsky, AScT** has over 25 years of industry experience in process control optimization. He is a recognized expert in optimizing pipeline control performance and has extensive experience in troubleshooting.

**Tyler Rushfeldt, P.Eng.** has over 10 years' experience across various aspects of the pipeline industry, notably steady state and transient hydraulics and currently specializing in pressure control applications.

## WHO SHOULD ATTEND

The course is primarily intended for process control engineers, operations engineers and experienced instrument and electrical technicians. The Pipeline Process Control Optimization basics course (or equivalent) is a prerequisite for attendance. The course explores the implications of process equipment design on control performance and would be beneficial for maintenance and design engineers.

## COURSE LOCATION

The course will be held at the Sawridge Inn Edmonton South (4235 Gateway Boulevard North, Edmonton, AB T6J 5H2). Registrants are responsible for their own hotel room reservation. For your convenience we recommend that you stay at the Sawridge Inn (780-438-1222 or toll free 800-565-1222).

## REGISTRATION

Registration fee is \$1750 CDN (including taxes) for the 2-day course. Please register 3 weeks in advance (at [www.pronamicscontrol.com](http://www.pronamicscontrol.com)) to ensure that space and materials will be available. Venturi / ProNamics reserves the right to cancel the course based on a minimum number of registrants.

# COURSE SCHEDULE

## Day One

- Lecture 1**      **Review of Process Dynamics / Lambda Tuning Concepts**  
08:00 - 09:00
- Lecture 2**      **Pressure Control Strategies**  
9:00 - 10:30  
Override Control, Output Characterization  
Split Ranging, Coordinated VFD control
- Lab 1**            **Pressure Control Strategies**  
10:30 - 12:00  
Split Ranging  
Output Linearization  
Lambda Tuning
- Lecture 3**      **Flow Control Applications**  
1:00 - 2:30  
Flow sensors  
Process Dynamics  
Control strategies (Pressure Override, Cascade)  
Lambda Tuning
- Lab 2**            **Flow Control Applications**  
2:30-4:30  
Flow loop dynamics  
Flow / Pressure Override  
Flow/Pressure Cascade

Lunch Breaks between 12:00 & 1:00 each day

## Day Two

- Lecture 4**      **Viscosity Control**  
8:00 - 9:30  
Definitions, Sampling/Measurement systems  
Viscosity versus Temperature relationship  
Dynamics, Viscosity Control Strategies -  
Ratio, Cascade, Feedforward
- Lab 3**            **Viscosity Control**  
9:30 - 11:00  
Measuring Dynamics  
Control Strategy comparison  
Response to Disturbances  
Lambda Tuning
- Lecture 5**      **Troubleshooting Pipeline Control Problems**  
11:00 - 12:00  
Advanced Control troubleshooting
- Lab 4**            **Troubleshooting Lab**  
1:00-4:00  
Advanced Control Strategies  
Output Linearization  
Interacting Control Loops  
Cascade Loops
- Wrap-Up**  
4:00-4:30

## ABOUT Venturi Engineering Solutions / ProNamics Control

**Venturi Engineering Solutions** is based in Edmonton, AB. The company provides pipeline hydraulics, leak detection, operator qualification and data analytic services to the pipeline sector. Venturi has recently allied with **ProNamics Control** to provide process control services including PCV sizing/selection, controller tuning and output linearization, field PCV and VFD tuning commissioning services, and training.

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