Instrumentation
Controllers

✓ Course Objectives

1. Explain the function of controllers in a simple closed control loop model.
2. Define the terms: automatic to manual, manual to automatic, setpoint, tuning, direct acting, reverse acting, proportional band/gain, integral/reset, derivative/rate, and "bumpless" transfer.
3. Explain making setpoint adjustments on local and remote controllers.
4. Explain use of programmable logic controllers (PLC).
5. Explain use of distributed control systems (DCS).
6. Identify common controller drawings on P&IDs.

Key Terms (Define the following)

Controllers - _____

_____

Programmable Logic Controller (PLC) - _____

_____

Distributed Control System (DCS) - _____

_____

Process equilibrium - _____

_____

Dead time - _____

Lag time - _____

Gain - _____

✏️ Principles

Controller Types and Location

(FIC)	Local (field) controller
(FIC)	Panel-mounted local controller
[FIC]	Local (field) DCS/PLC display
[FIC]	Remote DCS/PLC display
◇FIC◇	Local (field) PLC display
◇FIC◇	Panel-mounted local PLC

📝 Questions

1. Pneumatic controllers typically are installed remotely.
   - ☐ True
   - ☐ False

2. At a basic level, you need three things to control a process:
   - ☐ DCS, PLC, and a method for choosing the correct action
   - ☐ Purpose, a set of controllers, and a method for choosing the correct action
   - ☐ Purpose, a set of choices, and a method for choosing the correct action
   - ☐ A set of controllers, a PLC, and a DCS

3. Comparing a measured variable to a set point to make controlled decisions is called
   - ☐ an open loop.
   - ☐ a closed loop.

4. _____ describes the controlled variable signal cycling above or below the set point or exhibiting random behavior.
   - ☐ Oscillation
   - ☐ Hunting
   - ☐ Overshoot
   - ☐ Hysteresis