

Basic Instrumentation

This five-day course provides technicians with an understanding of basic instrumentation theory and application.

I. Fundamentals of Electronic Instrumentation

- Electronic Transmitters
- Electronic Controllers
- Common Electronic Circuits
- Power Supplies
- Oscillators

II. Instrumentation Amplifiers

- Noise and Drift
- Discrete Component Instrument Amplifiers
- Chopper Input DC Amplifier
- Integrated Circuit Instrument Amplifiers

III. Electronic Transmitters

- LVDT Motion to Current Transmitters
- Force Balanced Motion to Current Transmitters
- Capacitive Motion to Current Transmitters
- Resistance to Current Transmitters
- Motion to Resistance to Current Transmitters
- EMF to Current Converters

IV. Transmission of Control Signals by Wire

- Electric Signal Noise
- Capacitive Coupled Noise
- Inductive Coupled Noise
- Directly Coupled Noise
- Noise Elimination
- Single Ended Grounded
- Single Ended Floating
- Balanced Floating
- Noise Reduction

- Common Mode Rejection Ratio
- Electronic Signal Ranges
- Instrument Supply Voltages
- Signal Cable Installation
- Intrinsic Safety

V. Electronic Controllers

- Physical Arrangements-Front
- Physical Arrangements-Side
- Controller Block Diagram
- Controller Proportional Response
- Controller Proportional plus Integral Response
- Controller Proportional plus Integral plus Derivative Response
- Controller Output
- Characteristics of Commercial Controllers
- Bailey Type 701
- Westinghouse Type 7300
- Foxboro Spec. 200 Series Control Unit

VI. Electronic Control Arrangements

- Basic Control Channel
- Control Valves
- Pneumatic Control Valve Actuators
- Electro-Hydraulic Actuator
- Manual Actuators
- Valve Positioners
- Electric Proportional Valve Actuators
- Solenoid Actuators
- Electrical Power Control
- Process Control Loops
- Temperature Control Loops
- Pressure Control Loops
- Flow Control Loops
- Level Control Loops

- Cascade Control
- Ratio Control
- Feedforward Control

VII. Transducers and Converters

- Pneumatic to Current Voltage Converter
- Electronic to Pneumatic Transducers