



**INSTRUMENTATION TRAINING AND CONSULTING GROUP  
FUNDAMENTALS OF INSTRUMENTATION AND CONTROL COURSE**

**DAY 1 THEORY**

- Terminology
  - Drawings - symbols and standards
  - Pressure measurement, units of pressure
  - Calibration procedures
  - Calibration standards
  - Transmission theory
  - Differential pressure transmitters
  - Level measurement
  - Calculations for open and closed vessels
  - Density measurement
- PRACTICAL**
- Sketch a P & ID
  - Sketch loop drawing
  - On/off control

---

**DAY 2 THEORY**

- Process lags
  - Feedback control
  - Control modes and their interaction
  - Pneumatic controllers
  - Open and closed loop tuning methods
- PRACTICAL**
- Calibrate pneumatic d/p cell
  - Calibrate pneumatic controller
  - Align pneumatic controller
  - Tune flow loop

---

**DAY 3 THEORY**

- Flow measurement - PD, head and velocity types
  - Ohms law
  - Electrical control loops
  - Electronic transmitters
  - Split architecture
  - I/O buffers
  - Isolators
  - Operation amplifiers
  - Analogue electronic controllers
  - Digital controller configuration
- PRACTICAL**
- Calibrate an electronic transmitter
  - Calibrate a signal converter
  - Tune a level loop
  - Configure a digital controller or implement an analogue electronic control system

**FUNDAMENTALS OF INSTRUMENTATION AND CONTROL COURSE**

- DAY 4 THEORY**
- Cascade control
  - Ratio control
  - Feedforward control
  - Scaling
  - Self tuning controllers
  - Temperature measurements - thermal, RTD, thermocouples
  - Valve positioners
  - Valve position transmitters
- PRACTICAL**
- Implement a self tuning function
  - Implement a cascade control system
  - Calibrate valve positioners
  - Measure temperature using RTD's and thermocouples

- 
- DAY 5 THEORY**
- Control valves
  - Boiler controls and typical applications
  - Conductivity measurement
  - pH measurement
  - Revision
- PRACTICAL**
- Complete unfinished tasks

Typical course hours:- Monday to Thursday 0830 - 1630  
Friday 0830 - 1500  
Lunch - half an hour  
After hours: Supervision will be given until 1730 if required at no extra charge.

Synopsis:- This course is very practically orientated using a real process to measure and control flow, level pressure position & temperature. No prerequisites are required and is suitable for senior operators, trades personnel and engineers. The course is ideal for multiskilling - cross training of trades personnel.

Cost:- \$1650.00 including 10% GST. Also includes a comprehensive training manual and lunch each day.

Note:- Due to the hands on nature of this course, numbers are generally limited.