BOOST
THE LEADING TRAINING PROVIDER

Electrical Engineering

Advancement In Process Measurement

Course Introduction

The measurement and control problem

In an industrial situation where it is required to measure and control some aspect of a process, it is often the application of the knowledge and the ingenuity of the engineer or technician which is relied upon to solve the measurement and control problem.

Therefore, a fundamental understanding of the principle of operation of a range of sensors/ transducers and instrumentation techniques applicable in an industrial situation combined with an understanding and knowledge of process control techniques and tuning methods equips the engineer or technician with the necessary skills and makes them invaluable in their workplace.

In this training program, participants will investigate the operating principles and concepts of instrumentation and measurement systems and will acquire the knowledge relating to the characteristics and properties of the variables being measured.

Moreover, the participants will gain an understanding of the Process control systems and methods used in a modern industrial system.

This is a hands-on, practical training program and where applicable, theoretical studies will be supplemented with practical activities where the delegate will have the opportunity to design, develop, build, test and evaluate their own instrumentation systems within the course room.

Target Audience

- Electrical Engineers
- Design Engineers
- Electrical Technicians

Learning Objectives

- Understand the principles of operation of a range of sensors and transducers.
- Investigate the operation of an instrumentation system through designing, build and test typical sensor combined with appropriate signal conditioning circuits.
- Become familiar and confident with a range of measurement techniques.
- Understand the concepts of Process Control and acquire the knowledge relating to the characteristics and properties of a process variable being measured.
- Become familiar and knowledgeable with PID control and develop the ability to ‘tune’ a process control system using PID control.
- Have the confidence and knowledge to apply the above techniques and principles to solve an unfamiliar and bespoke measurement situation in the workplace.

Course Outline

- **DAY 01**

  Introduction to Sensors, Transducers and Instrumentation Systems

  Terms and definitions associated with Instrumentation systems, including:

    - Maximum error.
    - Hysteresis.
    - Repeatability.
    - Sensitivity.
    - Resolution.
    - Span.
    - Response time.
    - Process Variables: Mass flow:
    - Volumetric flow rate.
    - Pressure.
    - Viscosity.
    - Turbidity.
- **Day 02**

Introduction to Practical and Operator Considerations:

- Installation.
- Mechanical.
- Electrical.
- Communications.
- HMI.
- Maintenance.
- Mechanical.
- Electrical.
- Communications.
- HMI.
- Troubleshooting.
- Mechanical.
- Electrical.
- Communications.
- HMI.
- Strain, Pressure and Flow Measurement.
- Principle of Strain Measurement – tension, compression, stress, strain, Youngs modulus:
- Principle of operation, typical uses and installation considerations.
- Gauge types – principle of operation and configurations.
- Principles of Pressure measurement.
- Principle of operation, typical uses and installation considerations.
- Principles of flow measurement.
- Reynolds number.
- Principle of operation, typical uses and installation considerations of Invasive types.
- Principle of operation, application and installation considerations of Noninvasive types.
- Practical Application.

• **Day 03**

Temperature, Level and Non-Invasive Ultrasonic Measurement Techniques:

- Temperature scales.

Devices; principle of operation, typical uses and installation considerations of:

- Resistance Temperature Detectors (RTD’s).
- Thermistors.
- Thermocouples.

Devices; principle of operation, typical uses and installation considerations of:

- Ultrasonic techniques.
- Pressure techniques.
- Doppler shift and transit techniques.
- Ultrasonic flowmeters.
- Practical Application.

- **Day 04**

Introduction to Process Control Engineering

- Control Strategies.
- Block diagram representation.
- Control components.
- Servomechanisms and Regulators.
- Open and closed loop systems.
- Transfer Functions.
- Negative Feedback (NFB).
- Examples – Transfer functions and Closed Loop systems.
- ON/OFF control.
- Proportional control.
- Proportional band vs. proportional gain.
- Proportional offset.
- Derivative action.
- PID control.
- Practical Application.

- **Day 05**

Tuning PID Controllers:

- Empirical methods of setting Controllers.
- Open loop reaction curve method (Ziegler-Nichols).
- Default and typical settings.
- Closed loop continuous cycling method (Ziegler-Nichols).
- Fine tuning.
- Practical application.

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 26, 2025	May 30, 2025	5 days	4250.00 $	UAE - Dubai
Sept. 7, 2025	Sept. 11, 2025	5 days	4250.00 $	KSA - Riyadh
Nov. 24, 2025	Nov. 28, 2025	5 days	4950.00 $	England - London