



Consulting and Training | Reach New Heights

Course Name

Advancement In Process Measurement

Sector Name

Electrical Engineering

Document Type

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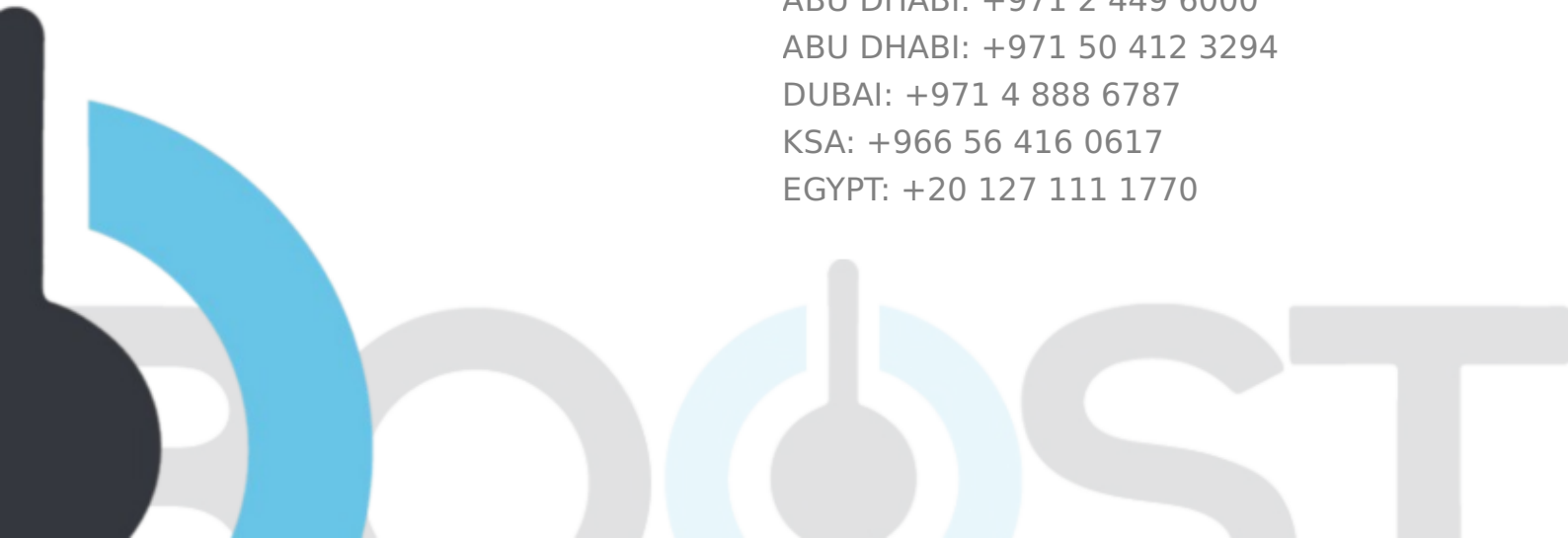
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Advancement In Process Measurement

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 that 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.

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Target Audience

- ✓ Electrical Engineers
- ✓ Design Engineers
- ✓ Electrical Technicians

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Learning Objectives

- ✓ Understand the principles of operation of a range of sensors and transducers.
- ✓ Investigate the operation of an instrumentation system through designing, building, and testing a 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.

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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.

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Course Outline

✓ 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, Young's 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.
- ✓ Principles of operation, application, and installation considerations of Noninvasive types.
- ✓ Practical Application.

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Course Outline

✓ Day 03

Temperature, Level, and Non-Invasive Ultrasonic Measurement Techniques:

- ✓ Temperature scales.

Device, 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.

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Course Outline

✓ 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.

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Course Outline

✓ 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.

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Sept. 13, 2026	Sept. 17, 2026	5 days	4250.00 \$	KSA , Riyadh
June 14, 2027	June 18, 2027	5 days	4250.00 \$	UAE , Dubai
Nov. 30, 2026	Dec. 4, 2026	5 days	4950.00 \$	England , London
March 15, 2027	March 19, 2027	5 days	4250.00 \$	UAE , Abu Dhabi

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