



## AIMS – Grad Training – Process & Instrumentation

Course Name: Instrumentation Level 1

Duration: 1week

### 1. Process Parameter & Measurement

- 1.1 Inherent & Acquired Process parameters and units
- 1.2 Principles of direct gaging of Length, Time, Mass, Force / Stress, Temperature
- 1.3 Fluid Measurement principles- Pitot, Differential Press Instruments
- 1.4 Transduction Principles- Resistance Thermometry, Thermocouples, Pressure Transduction
- 1.5 Sensing electrical and magnetic fields, potential, current and charges
- 1.6 Mechanical transduction, vibration measurement

### 2. Process Plants Basics

- 2.1 Thermodynamic Processes and Cycles
- 2.2 Utilities & Controls- Thermal power plants, CCPP, IGPP, water treatment, Compressed Air, N2
- 2.3 Oil Gas Exploration and Processing
- 2.4 Sulfur extraction, ETP, Gas Cleaning, Unconventional Energy Systems

### 3. Packaged Special Measurements and Control

- 3.1 ESD, F&G and other protection systems
- 3.2 Security systems Image and bio processing
- 3.3 DCS PAC and Scada
- 3.4 Meter Skids, Machine Monitoring, BMS, Governors, Pyrometers and Fore Systems





# Analytical Instrumentation & Maintenance Systems

## 4. Process Analytics

- 4.1 Basic Physical parameters- Density, Viscosity, Calorific value,
- 4.2 Typical Fuel parameters- RVP, Color, Wobbe Index
- 4.3 Electrochemical Thermal and electrical sensors- gas detection, humidity, TCD, adsorption
- 4.4 Microwave and optical and ultrasonic detection- Emission, absorption, interference, scattering
- 4.5 Gas Chromatography
- 4.6 Laser and Raman and mass spectroscopy
- 4.7 Introduction to wet lab analysis and liquid chromatography

## 5. Control Valves and Final Control Elements

- 5.1 Fluid control Dampers and Valving- Various Trims
- 5.2 Pneumatics and Hydraulics Components

## 6. Signal Processing and Transmission

- 6.1 Signals and noise – conducted and radiated interferences
- 6.2 Interference mitigation techniques – Earthing
- 6.3 Signal converters and transmission- Analog current, HART and other digital busses

