

CSIR-INDIAN INSTITUTE OF PETROLEUM, DEHRADUN

e-ITEC Training programme on Instrumentation and Process Control

Course Contents

....IST 1400HRS – 1700HRS....

Instrumentation

1. Basics of Instrumentation

- Temperature Measurement
- Flow Measurement
- Pressure Measurements
- Control valve
- Shutdown Valves

2. Basics of DCS

- Point database
- Graphics
- PID and PFD diagrams
- Tuning of Controllers (Proportional, Integral and Derivative controller)
- Manual, Auto and cascade mode operation.
- Control room ambience.
- UPS performance and connectivity with DCS and PLC.
- Plant operation details
- HARD WARE console operation.

3. Programmable Logic Controller

- Dual Modular and Triple Modular Redundancy
- Working of Interlock system explained
- Emergency shutdown system of the plant.

4. Analyzers

- Mass spectrometer
- Working of SO₂, NO₂, Oxygen Analysers
- Working and usefulness of Hydrogen Gas detector, LEL Hydrocarbon Gas detector and H₂S Detectors
- Working of Moisture Analyser

5. Historian and Alarm Management system.

6. Working of Furnace, Process Compressors, Turbines and Air compressors system

Process Control

- Fundamentals of Advanced Process Controls
- Basic concepts
- Process Identification
- Regulatory control principles
- Gain, Time constant and Dead time
- Closed Loop and Open Loop
- Feed-Forward and Feedback
- PID Control Concepts
- Controller tuning
- Basics of DCS Architecture and topology
- Major components of DCS
- Regulatory points, their various attributes and features
- The control network, sensors, controllers, MMI and their integration
- DCS Trends, History and major operational aspects of DCS
- Concepts of Inferential properties
- Development of Inferential properties–Principles and Techniques
- Development of Inferential properties–Methodology
- Advanced Regulatory controls
- Implementation issues
- Bias Update
- Basic Principles of Multivariable Control
- Advantage of MVPC over single loop
- Concept of CV, MV, DV
- Role of APC engineers in MVPC implementation
- Step testing, model building & FAT/SAT - Methodology and Significance
- Operational aspects of Multi-Variable APC
