

Instrumentation Design Engineering



What You Will Learn...

- ▶ Overview of EPC Industry and Scope.
- ▶ Role of Instrumentation Engineer in various types of Industry.
- ▶ Knowing Client requirements and collection of specific data for projects.
- ▶ Relevant Codes & Standards.
- ▶ Basic Design requirement based on the type of plant e.g. Chemical, Petrochemical, Pharmaceutical Industrial, power plant etc.
- ▶ Selection of Instruments for Controlling Flow, Temperature, level and Pressure.
- ▶ Vendor's details and specification for all Instruments used to control Flow, Level, Temperature and Pressure.
- ▶ Installation and maintenance Tips of all Instruments.
- ▶ Instrument Index, Instrument Location Plan Details
- ▶ Process Data sheets and Specifications, Instrument Data Sheets
- ▶ Instrument Wiring Layout, Logic Diagrams
- ▶ Loop Drawing, Loop Wiring Diagram, JB Layout
- ▶ Cable Schedule, Cable Tray Layout
- ▶ Hook-Up Drawing
- ▶ Introduction to PLC hardware

SmartBrains Oil and Energy Institute provides premium training courses for energy industry executives and fresh engineering graduates. Our success and distinguished reputation is thanks to our commitment to provide first-class programmes to our clients. Combining leading professionals from across the industry as lecturers and an interactive, practical format, the lessons learnt in a SmartBrains for Energy course are directly transferable back to the work place.

Our Strategic Objectives

To be recognized by industry and employers as a highly reputable training organization. Provide dynamic leadership, sound management and excellence in training. Continue to improve our services through quality management processes. Invest in and value our people through professional development activities. Grow our business through innovation and to continue to be financially secure. Be influential in the economic development of the industries we serve nation wise

Our Mission

“To provide quality training and assessment services and to prepare our students for a fulfilling professional career in their chosen industry. We are committed to upholding our values of providing excellence in training”

Course STRUCTURE



“It is really difficult to change your domain from O&M to designing, but designig trainig from smartbrians made it as smooth as butter. I got job in Designing with ease. I am very thankful to this institute of Designing”

Dilip Kumar Panda

United Systems India Pvt Ltd, Hyderabad

Basic Engineering Package for Instrumentation Engineering

- Overview of Basic Engineering Packages.
- Basic Design Requirement Based on Petrochemical, Oil & Gas, Refineries, Pharmaceutical, Power Plant, Steel Plant, Cement Plant etc.
- Overview of EPC Industries and Scopes.
- Designing Methodology of EPC Industry.
- Overview of an Engineering Organization.
- Role of Instrumentation Engineer in various Industries.
- Detail of Various Process Condition by Client side and their documents.
- Relevant ISA, API, IEC Codes and Standards.
- Process Data Sheet [PDS]
- Pipe Material Specification [PMS]
- Instrumentation Design Basis.
- Piping and Instrumentation Design [P&ID]
- Process Flow Diagrams [PFD].
- Vendor Doc Review
- Basics of Procurement Requirements.

Selection & Sizing of Pressure Element & Transmitters

- Method of Measurement of Std. Pressure Gauge
- Std. Differential Pressure Gauges
- Mechanical Pressure Gauges
- Electrical Pressure Gauges
- Pressure S/W
- Diff. Pressure S/W
- Pressure Transmitters
- Diff. Pressure Transmitters
- Potentiometric Pressure Gauges
- Inductive Pressure Gauges, Piezoelectric Pressure Gauges

Selection & Sizing of Flow Element & Transmitters

- Method of Measurement of Orifice, Venturi, Wedge , Flow Nozzle, Rotameter, Magnetic, Vortex, Turbine, Coriolis, Thermal Dispersion, Ultrasonic, Pitot Tube

Selection & Sizing of Level Element & Transmitters

- Method of Measurement of Radar, Guided radar, Ultrasonic, Capacitance, Hydrostatic pressure, Differential pressure, Radiometric, Float Tank Gauge

Selection & Sizing of Temperature Element & Transmitters

- Method of Measurement of RTD, Thermocouple, Thermister, Pyrometer etc

Selection & Sizing of Position Element & Transmitters

- Method of Measurement of Inductive, Capacitive, Radar, Ultrasonic etc

Fundamental of Control Valves and Accessories

- Relevant ISA Codes & Std
- Types of Control Valves
- Working Principal of Control Valves
- Characteristics of Control Valves
- Cavitations, Flashing, Hashing, Erosion, Noise, Leakage, Pressure Drop, Chocking, High Temperature Response, Thermal & Mechanical Shocks etc
- Theory of Operation of Control Valve
- Selection & Sizing of Control Valves
- Input & output Measurement Std

Fundamental of FNG And ESD System

- Basics of Fire & Gas (F&G) System
- Theory of Operational Std
- Working Principal of F & G System
- Type of Detector & Alarm System
- Input & output measurement Std
- ESD [Emergency Shutdown Logics]
- I/O Type, Operation and Applications

Fundamental of Analyzers & Accessories

- Theory of operational Std
- Working Principal of Analyzers
- Input & output measurement Std
- Basics of Analyzers(Overview of PH, Oxygen, Silica and Sodium Analyzers, Conductivity, I/O Type, Operation and. Applications)
- Installation, Erection and Maintenance Tips of all Instruments
- Inspection and Troubleshooting of all Instruments

Fundamental of Hazardous Area Classification

- Hazardous Definition for Instruments system
 - Hazardous Area of Classification, Hazardous Analysis, Hazardous Operation, Hazardous Identification
 - Concept of Group, Div, Zones and Classes, Temperature, Explosion Triangle and Mode of Safety
- Electrical Equipment Suitable for use in Potentially Explosive Atmospheres, Certification Process
- Relevant Codes and Standards for Hazardous
- Industrial Safety Design for Instrumentation [Intrinsic Safety]
- Industrial Protection for Instrumentation [Ingress Protection]

Detail Engineering Design Documentation & Drawings

- Instrument Index sheet [IIS]
- Instrument Data/Specification sheet [IDS/ISS]
- Input/ Output List
- Cable Scheduling
- JB Scheduling
- Hook Up Drawing
- Loop Drawing
- Level Sketch
- JB Layout Diagram
- Inst Cable Tray Layout
- Instrument Cable Routing
- Instrument Nozzle Elevation Drawing
- Simple and Complex loop drawing
- Preparing Isometrics for Instrumentation Hookups
- Piping & Instrument Diagram
- Level Sketches
- Cable Tray layout
- Junction Box layout
- Panel wiring Layout
- Control Valve Assembly
- Mounting Layout Such as Support, Anchor and Sleeper Details
- Projects

Instrumentation Design Engineering

- Instrument Indexing
- Instrument Data Sheet /Specification Sheet
- Process Data Sheet
- Calculation and Sizing
- Field Instruments Wiring layouts
- I/O Listing
- JB Layouts
- Loop Drawing and Hookup Drawing
- Report Generate

Why

SmartBrains?

SmartBrains is the ultimate choice for all the working & non working engineer's in energy Sector training requirements. Our extensive portfolio of energy training courses are:

- ▶ 100% focused on the Oil and energy industry.
- ▶ Guided by the industry's renowned professionals with unprecedented knowledge of the Oil and energy industry.
- ▶ Highly interactive program with practical and relevant case studies.
- ▶ Training by extensively researched self developed cutting edge techniques.
- ▶ Skill development techniques with comprehensive set of documentation, practical skills and tools used in the Industry.

- ▶ The perfect opportunity to develop network and experiences with knowledge sharing.
- ▶ Internationally acclaimed engineering qualification.
- ▶ Designed for both Fresh engineers and working professionals to attain growth in oil and energy industry.
- ▶ One of the finest international faculty.
- ▶ Interactive, interesting and motivational training sessions.
- ▶ Access to enormous reference books and research materials.

Admission

Requirements

- ▶ Duly Filled Application Form
- ▶ 2 Photographs
- ▶ Photo State of Qualifying Examination
- ▶ Address Proof
- ▶ I.D. Proof
- ▶ Latest Resume

Declaration

- ▶ This training program is on AUTONOMOUS basis conducted by SmartBrains.
- ▶ SmartBrains has right to expel any student at any time for misbehavior, poor attendance without refunding the fees.
- ▶ Certification will be issued only after completion of course, submission of all assignments and passing all the examinations.
- ▶ SmartBrains has its own rules and regulations about conducting examinations and assessment of examinations



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