

## 25. Field & Systems Enclosures

- ❖ Enclosure Ratings
- ❖ Area Classification and Enclosures
- ❖ Terminations and Equipment Layout
- ❖ Power and Heat Rise Calculations
- ❖ Cable/Conduit Entries, Earthing

## 26. Construction/Commissioning

- ❖ Construction Scope of Work
- ❖ JB's, Instrument Enclosure Installation
- ❖ Impulse Tubes, Cable/Conduit Routing
- ❖ Loop checking, Hydro Test
- ❖ Pre - Commissioning / Commissioning

## 27. Foundation FieldBus

- ❖ Serial / Ethernet Communication
- ❖ Foundation Field Bus/HART
- ❖ FF Segment Drawings
- ❖ FF Calculations

## 28. INtools – Introduction

- ❖ Smart Plant Instrumentation–SPI (INtools) Overview
- ❖ Smart Plant P&ID Overview

## 29. VFD Configuration and Application

- ❖ What is VFD and its application.
- ❖ Advantages and Applications and programming of the drive parameters.
- ❖ Practical application by connecting to Motor.

## 30. Test and Feedback

- ❖ Job Consultancy
- ❖ Advance Training Certificate Distribution
- ❖ CV Development
- ❖ Mock Interview

**AEPL-T-002:**

### **PLC & SCADA AUTOMATION TRAINING**

#### **01. Introduction to PLC:**

- ❖ What is Automation it's advantages
- ❖ Introduction to PLC and role its role in Automation
- ❖ PLC Fundamentals - (Block diagram of PLC's)
- ❖ Architecture of PLC, Memory Map and addressing of Digital & Analog modules
- ❖ Introduction to the field devices attached to PLC
- ❖ Power supply, CPU, I/Os, Communication bus
- ❖ Various ranges available in PLC's and Wiring of the I/O's

#### **02. PLC Programming Level 1. (AllenBradley\_PLC using RS Logix Programming Software):**

- ❖ Developing different programs for the different applications.
- ❖ Configuring I/O Modules
- ❖ Connecting a Computer to a Communications Network
- ❖ Creating & Modifying an RSLogix new project
- ❖ Transferring a Project File to a Logix1200 Controller
- ❖ Creating Tags & Monitoring Data in an RSLogix 1200 Project
- ❖ Forcing of the I/O's. Managing RSLogix 1200 Project Files

- ❖ Entering, Editing, & Verifying Ladder Logic
- ❖ Programming Basic and advanced Instructions
- ❖ Timer, Counter, Move and Analog Instructions
- ❖ Programming using Compare Instructions

#### **03. PLC programming 2. (Nexgen2000 PLC using CoDeSys programming software):**

- ❖ Introduction to PLC Messung, Nexgen2000 PLC(HW)
- ❖ Introduction to CoDeSys software.
- ❖ Memory addressing concepts, Digital and analog modules.
- ❖ Addressing of Inputs, Outputs, Memory bits and Analog module.
- ❖ Creating programs using Instructions Timers, Counter, Move and ADD.
- ❖ Simulation test and Forcing of IO's during programming.
- ❖ Setting up communication systems between PLC and SCADA.
- ❖ Troubleshooting of Hardware and software, Modification and forcing applications.

#### **04. SCADA developing and interfacing with PLC using Ellipse software:**

- ❖ Purpose and application of SCADA.
- ❖ Creating a SCADA application
- ❖ Creating Tags and Editing graphic display with animation
- ❖ Data Entry / Start Stop command
- ❖ Analog entry Sizing, Movement, Blinking, Visibility, Filling.
- ❖ Communication protocols with PLC
- ❖ Methods of developing programs for the SCADA.
- ❖ Communication between PLC and SCADA.
- ❖ Checking the program with developed SCADA.

#### **05. VFD drive :**

- ❖ What is VFD and its application.
- ❖ Advantages and applications and Programming of the drive parameters.
- ❖ Practical application by connecting to Motor.

#### **06. Automation Systems – Common Features**

- ❖ General Block Diagram
- ❖ Definitions DCS/ESD/PLC/RTU/SCADA
- ❖ Differences in DCS/ESD/PLC/RTU/SCADA
- ❖ Applications of DCS/ESD/PLC/RTU/SCADA
- ❖ Automation System Architecture

**Visit website for more Details :**

**[www.avidus.in](http://www.avidus.in)**

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**AVIDUS ENGINEERING PRIVATE LIMITED (AEPL)**  
**Unfolding Technology**

**° EhOu- 1**

## **INSTRUMENTATION AND PROCESS AUTOMATION**

**TRAINING PROGRAMME**

**DURATION : 4 WEEKS**

**DAILY : 4 HOURS**

**° -hOu 2**

## **PLC & SCADA AUTOMATION**

**TRAINING PROGRAMME**

**DURATION : 4 WEEKS**

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# AEPL-T-001 INSTRUMENTATION AND PROCESS AUTOMATION

## MEASUREMENTS AND PLC INTRODUCTION (Volume-1)

### 01. Introduction to Training Courses

- ❖ Process Instrumentation & Automation
- ❖ Process Industries
- ❖ Different Fields of Activities
- ❖ Design/Engineering & Construction
- ❖ Commissioning, Operation & Maintenance
- ❖ Instrumentation – Inter Disciplinarian Course

### 02. Measurements – Pressure, Vacuum

- ❖ Gauge /Absolute/Differential Pressure, Vacuum
- ❖ Local Instrument, Transmitter
- ❖ Instrument Installation and Commissioning

### 03. Measurements – Temperature

- ❖ Temperature Sensors-RTD, TC, Transmitter
- ❖ Thermowell Selection and Sizing
- ❖ Instrument Installation and Commissioning

### 04. Measurements – Level

- ❖ Level Gauges-Transparent, Reflex
- ❖ Float/Displacer Level Switch/Gauge
- ❖ Level Transmitter-Ultrasonic, Capacitance, GWR
- ❖ Instrument Installation and Commissioning

### 05. Measurements – Analytical

- ❖ Chromatograph
- ❖ Analyzer Shelter
- ❖ Oxygen Analyzer-Zirconia
- ❖ H<sub>2</sub>S/LEL Analyzers
- ❖ Instrument Installation and Commissioning

### 06. Measurements – Flow

- ❖ Flow meter-DP Type
- ❖ Flow meter-Magnetic
- ❖ Flow meter-Ultrasonic
- ❖ Flow Meter-Coriolis
- ❖ Instrument Installation and Commissioning

### 07. Programs with Allen Bradley PLC and Batch Processes

#### Introduction to PLC:

- ❖ What is Automation its advantages
- ❖ Introduction to PLC and its role in Automation
- ❖ PLC Fundamentals - (Block diagram of PLC's)
- ❖ Architecture of PLC, Memory Map and addressing of Digital & Analog modules
- ❖ Introduction to the field devices attached to PLC
- ❖ Power supply, CPU, I/Os, Communication bus
- ❖ Various ranges available in PLC's and Wiring of the I/O's

#### PLC Programming Level-1.

- ❖ Developing different programs for the different applications.
- ❖ Configuring I/O Modules
- ❖ Connecting a Computer to a Communications Network
- ❖ Creating & Modifying an RSLogix new project
- ❖ Transferring a Project File to a Logix1200 Controller

- ❖ Creating Tags & Monitoring Data in an RSLogix 1200
- ❖ Forcing of the I/O's. Managing RSLogix 1200 Files
- ❖ Entering, Editing, & Verifying Ladder Logic
- ❖ Programming Basic and advanced Instructions
- ❖ Timer, Counter, Move and Analog Instructions
- ❖ Programming using Compare Instructions

## ANALOG/ DIGITAL CONTROLS AND PLC PROGRAMMING (Volume-2)

### 08. Control Theory - Feed Back Control

- ❖ Proportional Control
- ❖ Proportional-Integral (PI) Control
- ❖ Proportional-Integral-Derivative (PID) Control
- ❖ Controller Tuning Methods

### 09. Single Pneumatic/Electronic Controller

- ❖ DCS Controller- Display
- ❖ Press./Temp./Level/Flow Controls
- ❖ Cascade Control
- ❖ Three Element Control

### 10. Control Laboratory - Flow/Level/Pressure/Temp Trainers

- ❖ Flow Control
- ❖ Level Control
- ❖ Pressure Control
- ❖ Temperature Control

### 11. Logic Development

- ❖ Basic Philosophy
- ❖ Types of Logic
- ❖ Logic Development Examples
- ❖ Control Philosophy / Logic Narratives

### 12. PLC Programming – Nexgen 2000 (Level 2)

#### PLC programming 2. (Nexgen2000 PLC using CoDeSys programming software) :

- ❖ Introduction to PLC Messung, Nexgen2000 PLC ( HW).
- ❖ Introduction to CoDeSys software.
- ❖ Memory addressing concepts (Digital and analog)
- ❖ Addressing of Inputs, Outputs, Memory bits and Analog module.
- ❖ Creating programs using Instructions Timers, Counter, Move and ADD.
- ❖ Simulation test and Forcing of IO's during programming.
- ❖ Setting up communication systems between PLC and SCADA.

## CONTROL VALVES/RELIEF VALVES,ACTUATORS AND SCADA DEVELOPMENT (Volume-3)

### 13. Test and Calibration of Instruments

- ❖ Servicing/Trouble Shooting
- ❖ O & M Planning
- ❖ O & M Manuals

### 14. Control Valves

- ❖ Study of Different Types and Applications
- ❖ Selection and Sizing

### 15. Relief Valves

- ❖ Study of Different Types and Applications
- ❖ Selection and Sizing

### 16. Valve Actuators

- ❖ Pneumatic/Electric/Hydraulic
- ❖ Selection and Sizing

### 17. Auxiliary Systems - VMS & VFD

- ❖ Vibration Monitoring Systems (VMS)
- ❖ Variable Frequency Drives (VFD)

### 18. SCADA Development and Interfacing with PLC

- ❖ Purpose and application of SCADA.
- ❖ Creating a SCADA application
- ❖ Creating Tags and Editing graphic display with animation
- ❖ Data Entry / Start Stop command
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- ❖ Differences in DCS/ESD/PLC/RTU/SCADA
- ❖ Applications of DCS/ESD/PLC/RTU/SCADA
- ❖ Automation System Architecture

## DETAILED ENGINEERING AND VFD CONFIGURATION (Volume-4)

### 20. Engineering-Types of Drawings-P & ID

- ❖ Drawings Types, Size, Scale, Revision
- ❖ Drawings Notes, Legend, Symbols, References
- ❖ Drawing Control-Drawing Index
- ❖ Piping and Instrumentation Diagram (P&ID)

### 21. Engineering-Wiring Drawings-ILDs

- ❖ Drawings Notes, Legend, Symbols, References
- ❖ Wiring Drawings
- ❖ Elementary Drawings
- ❖ Instrument Loop Diagrams (ILDs)

### 22. Engineering-Instrumentation Cable Dwgs.

- ❖ Cable Block Diagram
- ❖ Cable Conduit Schedules (CCS)
- ❖ Cable/Conduit Layout Drawings
- ❖ Cable/Conduit Selection and Sizing

### 23. Engineering-Instrument Installation Dwgs.

- ❖ Installation/Hook-up Drawings
- ❖ Material Take-Off (MTO)
- ❖ Impulse Tubes-Fittings-Selection
- ❖ Conduit-Fittings-Selections
- ❖ Purchase Requisitions / Technical Evaluation

### 24. Engineering-Instrument Specifications

- ❖ Instrument Specification Sheets (ISS)
- ❖ ISS-Local Instruments
- ❖ ISS-Transmitter
- ❖ ISS-Valves
- ❖ ISS-Actuators
- ❖ I/O List-Data base