PLC Technology 1: Fundamentals of Ladder Logic with S7-1200 Course Outline

Catalog number	8220-0010
Category	Electronics and Electrical Control
Duration	15 Hours
Software supplied	Siemens STEP7 TIA Portal V13
Prerequisites	Pneumatics or Hydraulics Technology courses (recommended)

Activity 1: Getting Started

Programmable Logic Controllers (PLC)

Inputs and Outputs

Your Physical PLC

Activity 2: Connecting the PLC

Programmable Logic Controller

TIA Portal Software

The Siemens Interface

Connecting the Hardware

Inventory and Safety Checks

Inventory Check and Shut Down

Activity 3: Writing a Basic Ladder Diagram

What is Logic?

Logic Functions

Logic Variable Addresses

Introduction to Ladder Logic

Normally Open (NO) Contact Instructions

Assignment Instructions

Designing Your First PLC Program

Programming a Basic Ladder Diagram

Downloading and Running a Program

Modifying the Ladder to Include an Additional Output

Activity 4: Project: Controlling a Sorting System

- Controlling a Sorting System
- Programming the Ladder Diagram
- Running the Program

Activity 5: NOT Logic

- Improving Control and Safety
- NC Contact Instructions
- Programming with NOT Logic
- Running the New Program

Activity 6: AND Logic

- Controlling an Elevator
- AND Logic
- Designing the Ladder Diagram
- Modifying the Elevator Control System

Activity 7: OR Logic

- OR Logic
- Designing the Ladder Diagram
- Programming with OR Logic
- Running the Program
- Adding a Warning Lamp to the System

Activity 8: Project: Arsenic Filling Station

- Arsenic Filling Station
- Designing the Ladder Diagram
- Programming the Ladder Diagram
- Simulating the Arsenic Filling Station

Activity 9: Latching and Unlatching Outputs

- Gate Control with PLC
- Ladder Design
- Set and Reset Instruction
- Programming with the Set and Reset Instructions
- Running the Program

Activity 10: Improving Elevator Control

- Elevator Control with PLC
- Designing the Ladder Diagram
- Building a Ladder Diagram to Control an Elevator
- Running the Program

Activity 11: The One Shot

- Controlling an Automatic Stapler
- One Shot Instruction
- Designing the Ladder Diagram
- Programming Without the One Shot Instruction
- Running the Program
- Revising a Program by Adding a One Shot Instruction
- Running the Modified Program

Activity 12: Timer On Delay

- Adding a Delay
- Timer ON Delay (TON)
- Programming with the TON Instruction
- Running and Monitoring the
- Adding a Five Second Delay

Activity 13: Timer Off Delay

- Controlling an Automatic Punch
- Timer OFF Delay (TOF)
- Programming with the TOF Instruction
- Running the Program
- Activating the Solenoid Using a TON (Instead of TOF)

Activity 14: Using the HMI

- Defining HMI
- The HMI Wizard
- HMI Screens
- Connecting and Tagging
- Memory Inputs

Activity 15: Conclusion

Recent Developments for PLCs

Final Project A

Final Project B