Viscar Industrial Capacity Limited
Enhancing Performance & Productivity

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www.viscarcapacity.com
NITA/TRN/735 OSH/BT 123 ISO 9001:2015 CERTIFIED

PLC and SCADA Level 1 Training

Duration: 40 Training Hours

Training Overview

This training provides participants with a comprehensive understanding of Programmable Logic Controllers (PLCs) and Supervisory Control and Data Acquisition (SCADA) systems used in industrial automation. It combines theoretical foundations with practical exercises to ensure learners can design, program, wire, and operate PLC control panels, as well as build integrated supervisory interfaces for real-time plant monitoring and control.

Training Objectives

By the end of the training, participants will be able to:

a) Understand foundational industrial automation concepts and SCADA/PLC system architectures.

b) Safely install, wire, and configure digital and analog input/output (I/O) devices with PLCs.

c) Read, interpret, and develop basic to intermediate ladder logic programs (using timers, counters, and comparators).

d) Integrate PLCs with SCADA systems, establish communication protocols, and configure data tags.

e) Design interactive SCADA graphic screens, alarm management, historical trends, and data logging functions.

f) Apply logical troubleshooting techniques to isolate and resolve system, programming, and network communication faults.

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Course Outline

Module 1: PLC Fundamentals & Hardware Architecture

This module introduces participants to foundational industrial automation concepts. Learners will explore the architecture of modern PLCs, internal memory layout, and the configuration of digital input and output (I/O) hardware. Key focus is placed on safe electrical wiring practices, sourcing vs. sinking configurations, and the physical setup of PLC processing units.

Module 2: PLC Programming & Instruction Sets

This module covers programming standards using ladder logic (IEC 61131-3). Participants are introduced to standard instruction sets, including contacts, coils, memory bits, and basic logic gates. Learners will gain hands-on skills in configuring and applying industrial timers (On-Delay/Off-Delay), up/down counters, comparison instructions, and basic math functions for operational control.

Module 3: Analog Signal Processing & Fault Finding

This module bridges discrete control with continuous process variables. Learners will understand analog inputs and outputs (voltage/current signals), sensor integration, signal scaling, and resolution. The module also covers systemic fault-finding procedures, diagnostic software tools, force functions, and online monitoring for physical PLC systems.

Module 4: SCADA Fundamentals & Communication Drivers

This module introduces the architecture of Supervisory Control and Data Acquisition (SCADA) systems. Participants will learn about SCADA-to-PLC communication links, driver selection, and industrial networking over protocols such as Modbus, Ethernet/IP, and OPC. Learners will practice configuring the SCADA database, creating communication channels, and defining device tags.

Module 5: SCADA Graphic Interface, Alarms & Logging

Participants are introduced to the creation and layout of interactive Human-Machine Interfaces (HMI) and SCADA dynamic screens. This module covers the configuration of graphic objects, color animations, real-time and historical trend plotting, alarm priority management, event logging, and secure runtime user administration.

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Module 6: System Integration, Projects & Maintenance

At this final stage, learners put their knowledge to practice through a complete PLC-SCADA integration project. Teams will implement a practical industrial application (such as motor/pump control or sequential tank filling), configure data logging/reporting, diagnose communication drops, and establish routine backup and preventative maintenance protocols.

Training Methodology (blended learning)

a) **Online Lectures & Visual Aids:** Interactive presentations, loop diagrams, networks, and software simulation tools for conceptual clarity.

b) **Hands-on Workshops:** Physically wiring, programming, and testing real-time loops on physical PLC and HMI/SCADA training benches.

c) **Scenario-Based Exercises:** Replicating real industrial plant failovers, sensor drops, and interlocking scenarios.

d) **Evaluation & Feedback:** Continuous assessments, practical project reviews, and interactive feedback sessions.

Target Audience

I. Electrical and Control Engineers

II. Maintenance Technicians and Automation Professionals

III. Industrial Operators and Plant Supervisors

IV. Engineering Graduate Trainees

V. Technical Trainers and TVET Instructors