



PLC & SCADA (SIEMENS) Syllabus

INTRODUCTION TO AUTOMATION:

- Industrial Automation
- Application of Industrial Automation
- History of Industrial Automation

Types of Automation:

- Need of Automation in industries
- Examples for industrial Automation
- Automation tools used in Industries

PROGRAMMABLE LOGIC CONTROLLER

- Introduction to Programmable logic controller
- Advantages of PLC over other controlling devices
- Automated environment for various applications
- Need of PLC for Industrial Automation

Block Diagram:

- Block Diagram of Programmable logic controller
- Internal Architecture of PLC
- Understanding the isolation barriers
- Types of PLC
- Introduction to PLC programming
- Different types of programming languages
- Ladder logic concept
- Do's & Don't in Ladder logic
- Latching & unlatching concept
- Need of pushbutton in industries
- Interlocking concept
- Types of interlocking
- **Exercise:** Ladder programming using interlocking concept
- Memory concept
- Ladder program using memory concept
- **Exercises:** Ladder programming using memory concept

INTRODUCTION TO SIEMENS PLC

- Hardware description of S7-300 CPU 313C series
- Working with STEP-7 Simatic manager
- SIMATIC manager toolbar description
- Step-7 addressing mode
- Memory mapping

INTRODUCTION TO TIA PORTAL (S7-1200 PLC)



- Working with TIA Portal V13
- Hardware configuration Project creation
- Inserting instructions into the user program
- Downloading the program
- Memory mapping

Analog & Digital Function:

- Working with Analog & Digital function blocks
- Bit logic operations
- Comparator operations
- Timers block in step7
- Counters block in step7
- Jumps instruction

TIA PORTAL (SIEMENS S7-1200)

- Working with Analog & Digital Function blocks
- Math operation
- Move block for analog function
- Conversion function
- Program control operation
- Word logic operation
- Shift and rotate

DB call function:

- Integer functions & integer point functions
- Program control
- Shift and Rotate instruction
- Introduction to Functional block diagram (FBD)
- Converting LAD to FBD
- Programming the logical functions in FBD
- **Exercises:** Ladder programming using timers & counters

TIA PORTAL (SIEMENS S7-1200)

- Timer operation
- Counter operation
- Functional block diagram
- Switching LAD to FBD
- **Exercises:** Ladder programming using timers & counters

Virtual Simulation:

- Interfacing PC & PLC with the provided communicable protocol
- Hardware configuration & PG/PC interface
- Interfacing PC & PLC with MPI Protocol
- Downloading a ladder program
- Uploading a ladder program



- Control Panel design & wiring
- Relay wiring
- Working with selector switch for different modes of control
- **Exercises:** Panel designing

INTRODUCTION TO SCADA:

- Introduction about SCADA
- Architecture of SCADA
- History of the SCADA
- Different types of communication system
- Need of Control and Monitoring Process for Industrial Automation

Introduction to Siemens WinCC:

- Components of WinCC flexible.
- GUI Elements of WinCC
- New Project Creation.
- Working with Different Screen.
- Working with Different Window
- Output Window
- Object Window
- Properties Window
- Project Window
- Reference Text Window
- Tools Window
- Script Wizard Window

Working with Communication:

- Internal Tags , External Tags, Data types, Acquisition cycle
- Importing and Exporting tags
- New Connections Creation Cycles
- Scada Window creation
- Develop SCADA window using Object toolbar and Graphics library
- Insert a Graphical Elements and Text.

Simple objects:

- Line, Polyline
- Polygon
- Ellipse
- Text Field
- I/O Field
- Date-Time Field
- Graphic I/O Field
- Symbolic I/O Field
- Graphic View
- Button
- Switch



- Bar
- Working with Object Move, Rotate, Mirror, Transparent, Alignment.
- Grouping and Ungrouping the Objects

Enable objects:

- Slider
- Clock
- Status Force
- Smart Client View
- HTML Browser
- User View
- Gauge
- Trend View
- Symbol Library
- Recipe View and Alarm View

Graphics Library:

- WinCC Flexible LibraryLibrary
- Button and Switches
- Faceplates Graphics

Object Animation CreationGeneral:

- Button mode
- Hotkeys
- TextProperties
- Appearance
- Layout
- Text
- Flashing
- Misc
- SecurityAnimation
- Appearance,
- Enable or Disable object
- Diagonal Movement
- Horizontal Movement
- Vertical Movement
- Direct Movement
- Visibility
- Size and Resize
- FillingEvents
- Click
- Press
- Release
- Activate,
- Deactivate Change

Script Execution:



- New Script Creation
- Script Wizard
- Text and Graphics List Creation
- Insert I/O Field
- Insert Graphic Field

Recipe Creation:

- Develop Recipe for Industrial Automation
- Paint Mixing
- Soft Drink Mixing
- Skipping Process in Sequence Control

Alarm Management:

- Analog Alarm
- Discrete Alarm
- Alarm Setting
- Design alarm system for Industrial Application

Historical Data:

- Data Logs
- Alarm Logs
- Import / Exports data to Excel
- Open Database Connectivity (ODBC)
- New Database Creation
- Import/Export data MS-EXCEL

Designing different Industrial Applications:

- Conveyor applications
- Drilling machine
- Filling machine
- Bottle filling

Interfacing PLC & SCADA using real time applications
Monitoring & Controlling the process using SCADA