QUALITAS TECHNO SOLUTIONS PVT. LTD.

S5,3rd floor, Omkar Plaza, Bagal chowk, Kolhapur(M.S) 416001
Email: ceo@qualitastechno.com Website: www.qualitastechno.com

PLC SCADA SYLLABUS

PLC Practice session software on: TIA Software using Siemens, Mitsubishi

Sr. No	Description	Per Day	No of Days	Total
1	PLC Theory	2 Hrs	8	16 Hours
2	PLC Experiments	2 Hrs (1 Hour theory+ Practical)	17	34 Hours
				50 Hours

Sr. No	Description	Per Day	No of Days	Total
1	SCADA Theory	2 Hrs	5	10 Hours
2	SCADA Experiments	2 Hrs (1 Hour theory+ Practical)	10	20 Hours
				30 Hours

PLC System Syllabus

Module-1

- Introduction about industrial automation
- History of industrial automation
- Need of automations in industries
- Example for industrial automation
- Automation control circuit and power circuit
- Control system in Industry

Module-2

- Introduction about Programmable Logic Controller
- History of PLC
- Architecture of PLC
- CPU
- IO Modules
- Power Supply and Communications
- Input and Output Devices
- Need of PLC for Industrial Automation

Module-3

- Types of PLC Models
- Introduction about PLC Programming
- Types of Programming Languages
- Introduction about PLC Programming software

Module-4

- PLC Fundamentals - (Block diagram of PLC's) Applications and Types of Transformers

- Selection of PLC components (Power supply, CPU, I/Os List , Communication bus Various ranges available in PLC's)
- I/O list selection /li>
- Open-Circuit and Short-Circuit Tests
- Types of Inputs & outputs / Source Sink Concepts
- Parallel Operation of Transformers
- Wiring of the I/O devices
- Architectural Evolution of PLC
- Introduction to the field devices
- Types of Inputs & outputs / Source Sink Concepts
- Wiring of the I/O devices
- Concept of flags and Scan cycle execution

Module-5

- Concept of flags and Scan cycle execution
- Setting up PLCs / Connecting CPU, I/O modules, Rack, Backplane and Communication bus
- Connecting Field devices to PLCs I/Os

Module-6

Programming instructions arithmetic and logical

- Load /and /or/out / and Read / Write
- Compare / Add / Sub /And /Or – Blocks
- Edge / trailing edge instructions
- MOVE block application, Timer and Counter Blocks programming
- Advanced instructions,
- File handling and Comment functions
- Master control /set /reset function

Module-7

- Monitoring Arrays & Tags of User-Defined Data Types
- Editing Ladder Logic Online
- Troubleshooting Controller Problems
- Monitoring GSV/SSV Instructions
- Forcing, I/O & Toggling Bits
- Troubleshooting, I/O Module Problems
- CPU, I/O module replacements
- Fault detection and error handling

Module-8

- Interlocking & Trip concept
- Types of interlocking

- Need of interlocking
- Timers
- Types of timers
- Example Problem for automation using timers

Module-9

- Need for counters
- Types of counters
- Example for automation using counters
- Jump and subroutine
- Importance of loop instruction
- Automation using Jump and Subroutine.

Example Problems

Module-10

- Upload and Download Program.
- Introduction about analog devices
- Interfacing analog devices to PLC
- Math function in FBD programming
- Bit function
- Other instructions

Module-11

- Shift and Rotate Instructions
- Math function
- Compare and Compute Functions
- Scaling Concept
- Explain about PI, PD, PID operation
- Explain control of conveyor system
- Develop the ladder program for conveyor system
- Execute the logic [relay] functions by using functional block
- diagram Develop The FBD program for conveyor system

Module-12

- Difference between auto control and manual control
- Explain suitable example for auto control with manual control
- Example for auto and manual control process and run in plc
- Explain about traffic light control
- Develop ladder program for traffic light control

- Develop FBD for traffic light control and run in PLC

Module-13

Control Valves:

- Necessity and types of valves used in Industries,
- Construction, Advantages, Disadvantages & applications of Globe:
- single, double, 3way, angle, Gate, Needle, Diaphragm, Rotary valves, Ball, Butterfly,
- working principle of pneumatically operated control valve and motorized control valve,
- Control valve accessories

Module-14

- Programmable Logic Controller (PLC):
- Necessity and working principle along with block schematic of PLC,
- Fixed & Modular PLC (Rack, Slot, Grouping),
- Specifications, manufacturers, Types of Input & Output modules (AI, DI, AO, DO),
- wiring diagram, Programming languages,
- Development of ladder for sequencing of motors, tank level control,
- ON-OFF temperature control.

Module-15

Application of PLC in major Industries:

- working and automation of pump house,
- Motor Control Centre (MCC),
- elevator, reactor, and bottle filling using the ladder diagram.

SCADA System Syllabus

Module-1

- Introduction about SCADA.
- Fundamental Principles of Modern SCADA Systems
- Advantages and Disadvantages
- SCADA Hardware and Software

Module-2

- Remote Terminal Unit (RTU)
- RTU Configuration
- RTU Hardware Modules
- Testing and Environmental Consideration

Module-3

- SCADA system application (Oil GAS / factory /Metro/ Solar Power Plant /Steel Plant)
- Calculation SCADA tag.
- Selection of Software basis of SCADA Tag.
- Creating Database of Tags

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Module-4

- SCADA Screen /Creating & Editing graphic display with animation
- Data Entry / Start Stop command
- Analog entry
- Sizing, Movement, Blinking, Visibility, Filling
- Trending
- Creating & Accessing Real-time
- Creating & Accessing Historical Trend

Module-5

- Creating Alarms & Events
- Connectivity with the different hardware
- Communication protocols (modbus/ TCP/IP)
- Communication with PLC
- Communication with Data Acquisition System
- Troubleshooting the application
- Fault diagnostics and error handling
- Sorting c

Module-6

Interfacing PLC to SCADA.

- Example Exercises 1 – Automatic Bottle Filling System
- Example Exercises 2 - Traffic Light Control

Module-7

- Example Exercise 3 -Program to Control Level of Parallel Tanks
- Example Exercise 4- Program to Operate Drilling of Parts

Module-8

- Industrial Project Documents
- P&ID Diagrams
- IO List Preparation
- Cause & Effect Diagram
- Single line Diagram
- Control Narratives
- Function Design Specification
- Introduction to SCADA and HMI.