Syllabus for PLC Operation &Maintenance Technician

Course Name	**PLC Operation & Maintenance Technician**
Sector	Instrumentation, Automation, Surveillance And Communication
Course Code	STC-IAS/2025/1901
Level	4
Occupation	PLC Operation & Maintenance Technician
Job Description	PLC Operation & Maintenance Technician operate and monitor PLC systems for efficient industrial automation processes. Perform routine maintenance, troubleshooting and repair of PLC hardware and software. Update and modify PLC programs to improve system performance and reliability.
Course Duration	**Total Duration Minimum 390Hrs.(T- 80 , P- 190 ,OJT-60 and ES-60)** **Maximum 480Hrs.(T- 110 ,P- 250 ,OJT-60 and ES-60)**
Trainees' Entry Qualification	12th grade pass OR Completed 2nd year of 3-year diploma (after 10th) OR Pursuing 2nd year of 3-year regular Diploma (after 10th) OR 10th grade pass and pursuing continuous schooling OR 10th Grade Pass2-year relevant experience
Trainers Qualification	NTC/NAC passed in the Trade of Electronics Mechanic/Electrician/Instrument mechanicwith three years' experience in the relevant field. OR Diploma in ECE/ETCE/EE/CSE/Instrumentation with 2 years experience in relevant field. OR B.E./B. TECH in ECE/ETCE/EE/CSE/Instrumentation with 1 year experience in relevant field.

Different Combination in which course may be offered

Course Name	Course Code	Course Duration	Full Marks
PLC Operation & Maintenance Technician	STC-IAS/2025/1901	390 Hours	1000
PLC Operation & Maintenance Technician [with Optional: INTRODUCTION TO SCADA]	STC-IAS/2025/1901 [with Optional IAS/1901/OC6]	420 Hours	1100
PLC Operation & Maintenance Technician [with Optional: HMI SOFTWARE -TIA PORTAL]	STC-IAS/2025/1901 [with Optional IAS/1901/OC7]	420 Hours	1100
PLC Operation & Maintenance Technician [with Optional: ADVANCED PLC PROGRAMMING]	STC-IAS/2025/1901 [with Optional IAS/1901/OC8]	420 Hours	1100
PLC Operation & Maintenance Technician [with Optionals:	STC-IAS/2025/1901 [with Optionals	450 Hours	1200

INTRODUCTION TO SCADA & HMI SOFTWARE -TIA PORTAL]	IAS/1901/OC6 & IAS/1901/OC7]		
PLC Operation & Maintenance Technician [with Optionals: & HMI SOFTWARE -TIA PORTAL & ADVANCED PLC PROGRAMMING]	STC-IAS/2025/1901 [with Optionals IAS/1901/OC7 & IAS/1901/OC8]	450 Hours	1200
PLC Operation & Maintenance Technician [with Optionals: INTRODUCTION TO SCADA & ADVANCED PLC PROGRAMMING]	STC-IAS/2025/1901 [with Optionals IAS/1901/OC6 & IAS/1901/OC8]	450 Hours	1200
PLC Operation & Maintenance Technician [with Optionals: INTRODUCTION TO SCADA, HMI SOFTWARE -TIA PORTAL & ADVANCED PLC PROGRAMMING]	STC-IAS/2025/1901 [with Optionals IAS/1901/OC6, IAS/1901/OC7 & IAS/1901/OC8]	480	1300

Structure of Course:

Module No.	Module name	Outcome	Compulsory/ Optional/ Mandatory	Theory (Hrs)	Practical (Hrs)	Total (Hrs)
1	**PLC basics and applications**	Identify PLC components, types and their function in industrial automation	Compulsory	20	40	60
2	**Basic PLCProgramming**	Create basic PLC programs using programming softwares	Compulsory	20	40	60
3	**Introduction to PLC-Based Automation**	Explain the role of PLC in automation	Compulsory	20	40	60
4	**Testing, Troubleshooting and Maintenance**	Test & troubleshoot PLC programs using software tools	Compulsory	20	70	90
5	**OJT**	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	Compulsory		60	60
6	**Employability Skill**	As per guided curriculum	Compulsory	60	--	60
7	**Introduction to SCADA**	Configure, monitor and control basic industrial processes using SCADA software	Optional	10	20	30
8	**HMI Software - TIA Portal**	Operate TIA portal to configure and test HMI screen for industrial automation	Optional	10	20	30
9	**Advanced PLC**	Develop and implement	Optional	10	20	30

	Programming	advanced PLC programs using analog control, PID loops and communication protocols				
		Total	**Minimum**	**140**	**250**	**390**
			Maximum	**170**	**310**	**480**

SYLLABUS:

Module No 1: Introduction to PLC

Outcome: Identify different parts of a PLC.

Theory Content:

- Define PLC and its importance
- Explain the role of PLCs in industrial automation
- Describe PLC components such as CPU, input/output modules, power supply an communication interfaces.
- Classify types of PLCs
- Explain the advantages of PLC-based control over Conventional relay-based control.
- List common components in EHLC (Electrical Hardware Logic Controller): relays, contactors, timers, limit switches, sensors and push buttons.
- Differentiate between Input and output models (Discrete & Analog)
- Describe PLC programming languages (Relay logic, Ladder logic, Structured Text (ST)
- Illustrate the process of connecting PLC to computer
- Describe the step-by-step process of installing PLC Software
- Highlights common uses of PLCs in manufacturing and other industries.

Practical Content:

- Identify PLC components
- Fix PLCs in control panels
- Connect input and output devices safely
- Test PLC Power Supply
- Test PLC Input and Output Modules
- Test CPU and Memory
- Connect PLC to computer
- Demonstrate the construction of PLC programming languages (Relay logic, Ladder logic, etc.)
- Install PLC Software & simulation software
- Find common errors like power failure or wiring faults
- Test the operation of an EHLC circuit using input-output simulations.

Module No 2: Basics of PLCProgramming

Outcome: Create basic PLC programs

Theory Content:

- Define PLC programming
- Describe architecture of a PLC
- Describe configuration of PLC (Simplex and Redundant)

- Explain the working cycle of a PLC (scan cycle)
- Describe types of programming languages (Ladder, FBD, STL)
- Explain basic logic gates (AND, OR,, NOT)
- Identify input (XIC, XIO) and output (OTE) instructions
- Write basic logic for start /stop circuits
- Program ON/OFF control for motors and lights
- Define memory types: input, output and data registers
- Apply safety measure in PLC programming

Practical Content:

- Identify PLC programming software
- Open PLC programming software (e.g. SIMATIC Manager)
- Configure the hardware in the software
- Create a program for switching a lamp ON/OFF
- Simulate the program to verify its logic.
- Assign addresses to push buttons and lamps
- Test the functionality of inputs and outputs
- Write a program using timer function
- Set time delay for turning a motor ON/OFF
- Program a counter to count objects on a conveyor belt
- Display the count on an HMI or PLC screen
- Upload and download programs to/from the PLC.
- Test the program with actual switches and indicators.
- Identify errors in logic and fix them.

Module No3: **Introduction to Automation**
Outcome: Explain Automation Concepts.

Theory Content:

- Describe the importance of automation.
- Identify key components: process, sensors, actuators, disturbances, communication devices, computers, control system
- Explain how PLC control machines automatically
- List advantages of using PLC in automation
- Describe how input signals are processed by PLC
- Explain the operational overview of a CPU
- Discuss the Piping and Instrumentation Diagrams
- Describe truth-table logic gates with symbol
- Explain simple circuits using logic gates
- Name industrial areas where PLC based automation is used

Practical Content:

- Demonstrate Piping and Instrumentation Diagrams,
- Identify computer hardware components, OS, software
- Illustrate the Operational overview of a CPU
- Demonstrate flow chart and algorithm
- Verify Truth Table using Logic Gates

- Construct simple circuits using logic gates.
- Power of PLC system
- Connect sensors and output devices to the PLC
- Open PLC software
- Create a new PLC programme for automation
- Simulate the process and check the logic
- Trigger the input device (sensor/switch) and observe the output action

Module No 4: Testing,Troubleshooting and Maintenance

Outcome: Test & troubleshoot PLC programs using software tools.

Theory Content:

- Explain testing and troubleshooting procedure.
- List testing tools like Multimeters, oscilloscopes, megohmmeters, logic analyzers and spectrum analyzers.
- List common PLC faults (Power failure, I/O fault, communication error)
- Discuss proper usage and handling of tools.
- Explain continuity, voltage, current and resistance testing procedure.
- Identify symptoms of hardware and software issues
- Explain the back up and restore PLC programs
- State safety precautions during PLC maintenance
- Identify open circuits, short circuits and grounding issues.
- Review procedures for testing on-site PLC programs.
- Examine techniques for troubleshooting faults in machines or process plants.
- Discuss the importance of regular maintenance in automation systems

Practical Content:

- Check power supply and module connections.
- Observe LED indicators for fault signals.
- Use software to monitor live input and output status.
- Simulate faults and test system response.
- Read and interpret error messages and fault codes.
- Correct wiring errors and replace faulty modules.
- Upload the PLC program and compare with backup.
- Restore original settings after troubleshooting.
- Clean modules and tighten loose connections.
- Maintain a log of maintenance and fault reports.
- Diagnose issues in PLC-based or robotic systems.
- Test temperature controls, sensors and compressors.
- Create fault logs and test reports.
- Prepare maintenance schedules based on troubleshooting data.

Module No 5 : OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours.**)

Module No 6 :Employability Skills(60 Hrs)

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this program, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PWD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration:5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely

19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

(Optional module)

Module No 7: Introduction to SCADA

Outcome: Configure, monitor and control basic industrial processes using SCADA software

Theory Content:

- Define the term SCADA (Supervisory Control and Data Acquisition)
- Explain its importance in industrial automation.

- Explain the basic architecture of a SCADA system including HMI, RTUs, PLCs and communication protocols.
- Describe the functions of SCADA such as data acquisition, monitoring and control.
- Identify the different components and layers of a SCADA system.
- Compare SCADA systems with DCS (Distributed Control Systems) and PLC-based control systems.
- List common industries and applications that use SCADA systems.
- Recognize the role of communication protocols like Modbus, Profibus and Ethernet in SCADA.
- Explain input and output tagging

Practical Content:

- Install SCADA software on a computer system.
- Configure a basic SCADA project using sample inputs and outputs.
- Connect SCADA software with a PLC/RTU using communication protocols.
- Create a Human-Machine Interface (HMI) to display sensor data in real-time.
- Simulate various industrial processes and observe SCADA control responses.
- Simulate the programme for ball in a bucket, bottle filling plant, 7 segment, traffic signal.
- Monitor data from virtual or real-time sensors on the SCADA dashboard.
- Log historical data and generate trend graphs and reports.
- Set alarm conditions for critical parameters and test their response.

(Optional module)

Module 8: HMI Software -TIA Portal

Outcome: Operate TIA portal to configure and test HMI screen for industrial automation

Theory Content:

- Define HMI and its role in automation.
- Explain architecture and features of TIA Portal.
- Describe components like screens, buttons, indicators and alarms.
- Identify HMI device types supported in TIA Portal.
- Illustrate communication flow between HMI, PLC and field devices.
- Discuss principles of ergonomic interface design.
- Compare HMI tools and interface options.
- Summarize steps to create a project in TIA Portal.
- Recognize functions like trends, diagnostics and data logging.
- Evaluate HMI contributions to safety and efficiency.

Practical Content:

- Launch TIA Portal and create new HMI project.
- Select HMI panel and configure device settings.
- Design screens using buttons, indicators, and input fields.
- Link HMI elements to PLC tags.
- Simulate screens and test functionality.

- Set up screen navigation.
- Implement alarms and messages.
- Configure trend displays and data logs.
- Download project to panel or simulator.
- Troubleshoot screen logic and connectivity issues.

(Optional module)

Module 9: Advanced PLC Programming

Outcome: Develop and implement advanced PLC programs using analog control, PID loops and communication protocols

Theory Content:

- Define advanced PLC concepts such as sequential control, analog processing and PID control.
- Explain data types, memory areas and addressing methods in PLC.
- Describe complex instructions like comparison, arithmetic, timer/counter operations.
- Analyze ladder logic, function block diagram (FBD) and structured text (ST) languages.
- Interpret control flow using subroutines, interrupts and jumps.
- Illustrate communication between multiple PLCs using industrial protocols.
- Identify the use of SCADA integration and HMI interfaces with PLC.
- Summarize safety standards and fail-safe programming practices.
- Evaluate the importance of diagnostic tools and error handling techniques.
- Discuss real-time control and advanced motion control applications.

Practical Content:

- Create advanced ladder logic programs for real-time process control.
- Configure analog input and output modules.
- Implement PID control for temperature, level, or flow regulation.
- Develop logic using timers, counters and arithmetic operations.
- Write and test subroutines for modular programming.
- Simulate analog and digital signals in the PLC environment.
- Interface PLC with HMI and monitor live data.
- Debug and troubleshoot logic errors using diagnostic tools.
- Connect and test communication between two PLCs.
- Upload and download complex PLC programs and verify system functionality.

LearningOutcome–AssessmentCriteria

Module No.	Outcome	AssessmentCriteria

Module No.	Outcome	AssessmentCriteria
1	Identify PLC components, types and their function in industrial automation	**After completionofthismodulestudentswillbeableto:** 1.1 Define PLC and explain its significance in control systems. 1.2 Identify and describe major PLC components and their functions. 1.3 Classify different types of PLCs and justify their applications. 1.4 Differentiate between discrete and analog I/O modules. 1.5 Demonstrate installation and configuration of PLC and simulation software. 1.6 Construct and simulate basic PLC programs using Ladder Logic or Relay Logic. 1.7 Test EHLC circuit functionality using simulated input-output conditions.
2	Create basic PLC programs using programming softwares	**After completionofthismodulestudentswillbeableto:** 2.1 Define PLC programming and describe its architecture and configuration. 2.2 Explain the PLC scan cycle and identify various memory types. 2.3 Describe and apply programming languages like Ladder, FBD and STL. 2.4 Explain logic gates and use them in PLC logic. 2.5 Create and simulate start/stop circuits and ON/OFF control programs. 2.6 Upload and download programs from the PLC and verify correct operation. 2.7 Test input/output functionality with real devices such as push buttons and indicators.
3	Explain the role of PLC in automation	**After completionofthismodulestudentswillbeableto:** 3.1 Demonstrate flow chart and algorithm 3.2 Verify Truth Table using Logic Gates 3.3 Construct simple circuits using logic gates. 3.4 Connect sensors and output devices to the PLC 3.5 Create a new PLC programme for automation 3.6 Simulate the process and check the logic 3.7 Trigger the input device (sensor/switch) and observe the output action

Module No.	Outcome	AssessmentCriteria
4	Test & troubleshoot PLC programs using software tools	**After completionofthismodulestudentswillbeableto:** 4.1 Explain testing and troubleshooting procedure. 4.2 List testing tools like Multimeters, oscilloscopes, megohmmeters, logic analyzers and spectrum analyzers. 4.3 List common PLC faults (Power failure, I/O fault, communication error) 4.4 Discuss proper usage and handling of tools. 4.5 Explain continuity, voltage, current and resistance testing procedure. 4.6 Identify symptoms of hardware and software issues 4.7 Explain the back up and restore PLC programs 4.8 State safety precautions during PLC maintenance
5	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	The assessor will check the report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 60 Hours.)
6	Employability Skill	As per guided curriculum
7	Configure, monitor and control basic industrial processes using SCADA software	**After completionofthismodulestudentswillbeableto:** 7.1 Define SCADA and explain its key functions 7.2 Describe the architecture and components of a SCADA system. 7.3 Compare SCADA with DCS and PLC-based systems based on functionality and applications. 7.4 Identify industries where SCADA is used and list the advantages of using SCADA systems. 7.5 Install SCADA software 7.6 Create and simulate HMI screens to display sensor data in real-time. 7.7 Connect SCADA software to PLC/RTU using Modbus, Profibus, or Ethernet protocol. 7.8 Simulate industrial processes such as bottle

Module No.	Outcome	AssessmentCriteria
		filling or traffic control using SCADA.
8	Operate TIA portal to configure and test HMI screen for industrial automation	**After completionofthismodulestudentswillbeableto:** 8.1 Define HMI and explain its role in industrial automation. 8.2 Describe the architecture and features of TIA Portal used for HMI configuration. 8.3 Identify and explain key HMI components such as screens, buttons, indicators and alarms. 8.4 Simulate screen behavior, test input/output functionality and check navigation flow. 8.5 Configure trend displays, data logging and implement alarms/messages. 8.6 Download HMI project to the panel or simulator and verify screen performance. 8.7 Troubleshoot interface issues, connectivity faults, and ensure screen logic accuracy.
9	Develop and implement advanced PLC programs using analog control, PID loops and communication protocols	**After completionofthismodulestudentswillbeableto:** 9.1 Describe PLC memory structure, data types and addressing techniques. 9.2 Develop and analyze control logic using ladder diagrams, FBD and structured text languages. 9.3 Create and test subroutines, interrupts, and jump logic for structured program flow. 9.4 Configure and use analog I/O modules and implement PID control for process regulation. 9.5 Demonstrate communication between multiple PLCs using industrial protocols. 9.6 Interface PLC with HMI/SCADA for real-time data monitoring and control.

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

Sl No	Items Name	Specification	Qty
1	Programmable Logic Controllers (PLCs)	Anyone Siemens (S7-1200/1500) /Allen-Bradley (CompactLogix/MicroLogix), Mitsubishi/ Omron	2
2	I/O Modules		2
3	DC power supply	24 volt, 2 amp	2
4	Actuators(servo motors and pneumatic cylinders)		2
5	IoT Edge Devices & Gateways	Raspberry Pi/ Arduino/ Siemens IoT2040	2
6	Drives and Motion Controllers(Variable Frequency Drives (VFDs) and Servo Drives)		2
7	Programming tool	Siemens TIA Portal (for Siemens PLCs). RSLogix 5000/Studio 5000 (for Allen-Bradley). GX Works3 (for Mitsubishi).	2
8	IoT Data Logging & Visualization	Node-RED/Grafana/Things Board/AWS IoT/Azure IoT Hub	2
9	SCADA platforms (Ignition, WinCC, FactoryTalk View, Wonderware)		2
10	Data Analytics & Reporting Tools (Power BI/ Tableau/ Python (Pandas, Matplotlib, Seaborn)/ SQL databases (PostgreSQL, MySQL))		5
11	Cybersecurity Testing Tools	Kali Linux/ Metasploit/ Snort (Intrusion Detection)/ OpenVAS (Vulnerability Scanner)	5
12	PLC simulation software (e.g., TIA Portal Simulator, LogixPro, or Codesys).		2
13	Robotic Simulators (e.g. RoboDK, ABB Robot Studio, Fanuc Roboguide, KUKA Sim)		2
14	Laptops or Desktops	Processor: Intel i5 or above. RAM: 8 GB or higher. Storage: 256 GB SSD or better. Include necessary communication ports (Ethernet, USB).	2
15	Ethernet Switches	8-port	5
16	Ethernet Cables	40 CAT6	2m
17	Converters	USB-to-RS232	5
18	Pushbuttons		6 nos.
19	Selector switches		6 nos.
20	Sensors	Proximity sensors(inductive/capacitive), photoelectric sensors	10 nos each
21	Indicator lights		10nos
22	Relays	24 DC	15

Sl No	Items Name	Specification	Qty
23	Small DC/AC motors Motors		5
24	Wire	1.2-core	100m
25	Terminal blocks		50 nos
26	cable lugs and connectors		30 sets
27	Multimeters		10
28	Circuit Breakers	MCBs (2A–5A, 24V).	10
29	Breadboards		10
30	HMI Panels	Siemens KTP series or Allen-Bradley PanelView	5
31	Oscilloscope		2
32	Fault Simulators		5
33	Screwdrivers	Phillips and flathead	10
34	Pliers	needle-nose, wire-cutting and crimping	10
35	Cable Strippers		10
36	Insulation Gloves		30
37	Safety Glasses		30
38	First Aid Kits		10
39	Training Manuals		30
40	Datasheets	PLC datasheets, I/O module specs, and user guides	10
41	Project Workstations		5
42	Labelling Tools		5

Marks Distribution

Outcome	Outcome Code	Type	Total Th marks	Total Pr marks	Total OJT marks
Identify PLC components, types and their function in industrial automation	IAS/1901/OC1	Compulsory	40	140	0
Create basic PLC programs using programming softwares	IAS/1901/OC2	Compulsory	40	140	0
Explain the role of PLC in automation	IAS/1901/OC3	Compulsory	30	140	0
Test & troubleshoot PLC programs using software tools	IAS/1901/OC4	Compulsory	40	230	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	IAS/1901/OC5	Compulsory	0	0	150
Employability Skills – 60 Hrs	DGT/VSQ/N0102	Compulsory	50	0	0
Configure, monitor and control basic industrial processes using SCADA software	IAS/1901/OC6	Optional	20	80	0
Operate TIA portal to configure and test HMI screen for industrial automation	IAS/1901/OC7	Optional	20	80	0
Develop and implement advanced PLC programs using analog control, PID loops and communication protocols	IAS/1901/OC8	Optional	20	80	0
Full Marks: Minimum1000 (Th 200, Prac. 650, OJT 150) without Optional Maximum marks 1100 ((Th 220, Prac. 730, OJT 150) with 1 Optional Maximum marks 1200 ((Th 240, Prac. 810, OJT 150) with 2 Optional Maximum marks 1200 ((Th 260, Prac. 890, OJT 150) with 3 Optional					