

Model Curriculum

Industrial Automation Specialist

Sector: Instrumentation Automation Surveillance &
Sub-Sector: Communication Automation
Occupation: Product Engineering / System Design
Ref ID: IAS/Q8005
NSQF Level: 5

List of NOS involved:

1. IAS/N2000 Design and Assemble Automation System
2. IAS/N2001 Technical Support for Installation and Commissioning of control panel
3. IAS/N2002 Coordination with Different Stakeholders
4. IAS/N2003 Health and Safety in Workplace

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Industrial Automation Specialist

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of an “Industrial Automation Specialist”, in the “INSTRUMENTATION AUTOMATION SURVEILLANCE & COMMUNICATION” Sector/Industry and aims at building the following key competencies amongst the learner:

Program Name	Industrial Automation Specialist		
Qualification Pack Name & Reference ID.	IAS/Q8005, V 5.0		
Version No.	2.0	Version Update Date	26/05/2022
Pre-requisites to Training	<p>10th + 3 Years Engineering Diploma in relevant field OR 10th + 2 years NTC or 2 years NAC + 1 year experience in relevant field OR Completed 1st Year or Pursuing 2nd Year of 3 Years Engineering Diploma in relevant field (after 12th or 2 years NTC after 10th) OR Completed 1st year or Pursuing 2nd year of BE/B-Tech in relevant field. Minimum Job Entry Age: 20 Years</p>		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Provide solutions to automation problems for manufacturing and process industries. • Capture client requirements of industrial automation needs • Study existing facilities, if any, at the client premises and suggest appropriate technologies and systems. • Identify I/O devices and interfaces required for the system. • Create wiring specifications, wiring layout and wiring plan. • Create specifications, drawings, and Bill of Quantities (BOQ) of the system to aid in procurement. • Design solutions based on recommended components and assist in making proposals. • Design wiring and interconnection layouts for the proposed system. • Design Panel drawing and layouts. • Develop programs for the PLC and SCADA systems included in the design to satisfy the user requirements. • Inspect the correctness of the procured systems against specifications. • Assemble / Supervise assembly of the system panel, with all components, terminals, and interconnections. • Perform wiring and I/O checks • Perform factory test of the control panel with dummy/simulated loads 		

	<ul style="list-style-type: none">• Document the project, test reports, and prepare user manual.• Supervise shipment of the control panel to customer site.• Perform site inspection and coordinate with the customer on site readiness.• Providing technical support for installation and commissioning of the control panel at customer site.• Test the control panel at customer site and ensure its powering up and proper operation.• Integrate the control panel to user systems as specified in order.• Perform user acceptance test and ensure all issues are closed.• Train the users on the operation of the panel.• Install automation system components and verify correct operation.• Provide technical support and guidance to the technicians and other personnel involved in the project.• Monitor progress at every stage and prepare logs.• Prepare test, inspection, failure, and acceptance reports and communicate to the superiors timely.• Escalate issue in time to get support from managers.• Follow health and safety norms of the industry• Work effectively in a multidisciplinary team
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This course encompasses 4 out of 4 National Occupational Standards (NOS) of “Industrial Automation Specialist” Qualification Pack issued by “Instrumentation Automation Surveillance & Communication Sector Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Design and Assemble Automation System</p> <p>Theory Duration (hh:mm) 45:00</p> <p>Practical Duration (hh:mm) 105:00</p> <p>Corresponding NOS Code IAS/N2000</p>	<p>Able to:</p> <ul style="list-style-type: none"> • Capture the process flow in the client industry • Understand the critical stages in the process and articulate about the possibility of automation in the existing processes and global trends in automation • Capture requirements of sensors, actuators, controllers, accessories and software and their specifications • Capture control and functional requirements of the user and draw specifications • Suggest possible automation alternatives with costs, time, effort, and justifications. • Assist in deciding on configurations, BOQ, deliverables and timelines • Prepare panel design and drawings Prepare wiring layout, I/O list, wiring list and drawings • Design and developing control system application – for PLC, HMI and SCADA • Design and develop other interfacing and communication software • Inspect the procured components • Supervise assembly and wiring of control panels • Test and troubleshoot the system developed • Conduct factory inspection and coordinate dispatch • Conduct site visit and customer interactions • Perform panel inspection at site and take corrective actions • Assemble control panel at site 	<p>Laptop, white board, marker, projector, Automation and Mechatronics lab, MS Office / Open Office software, PLC, SCADA Software, Industryvisit</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> • Ensure proper installation of field device, sensors, actuators, and power sources. • Supervise wiring and interconnections • Supervise integrity tests and powering of connected systems in a planned manner. • Assist in control loop tests in orderly manner • Assist in control loop tuning • Ascertain safety and security compliance of the system • Demonstrate system performance to client • Perform acceptance test and close issues • Document and file reports • Take backup of program, configuration and data • Escalate issues to superiors and take directions • Provide technical assistance and guidance to the field personnel and client team <p>Achieve quality and productivity standards</p>	
2.	<p>Technical Support for installation and commissioning of control panel</p> <p>Theory Duration (hh:mm) 60:00</p> <p>Practical Duration (hh:mm) 120:00</p> <p>Corresponding NOS Code IAS/N2001</p>	<p>Able to perform:</p> <ul style="list-style-type: none"> • Capture work requirement at site • Plan Installation and Commissioning work at site • Perform Site Inspection and ensure site readiness • Provide Technical Support for installation and commissioning of control panel, field devices, wiring and interconnections • Troubleshoot and rectify identified errors • Enable and troubleshoot control loops • Assist in performing control loop tuning • Assist in customer acceptance test and closure of issues • Achieve productivity, quality and safety standards as per company's norms 	<p>Laptop, white board, marker, projector, Automation and Mechatronics lab, Software, Industry visit, AutoCAD, Electrical safety accessories, Electrical switchgear, Conductivity meter, Earth pit and its components</p>

		<ul style="list-style-type: none"> • Basic AutoCAD Commands • Read AutoCAD drawings of Panel and Wiring Edit and create AutoCAD drawings of Panel wiring. • Use of Rubber soled Shoes, Gloves and Goggles where necessary • Measure Conductivity of Water • Install, use, troubleshoot MCBs, ELCBs, Fuses, SFUs • Design and build Earthing Pit Assemble Earthing Plates & Strips • Using a Multi-meter for Current, voltage (AC/DC), Resistance & Continuity measurements • Using a tester • Using a Tong-Tester • Using Pliers and Wire Stripper • Screwdriver Set (All terminal types) • Use of Allen Key Set • Using a Power Drill (Drill bits) • Using Insulation Tape • Using Wire Lugs • Using a soldering Iron • Using a Megger • Using Wrenches, Hammer, Wire bender etc. • Using a Ladder • Using Shielded cable tools Using LAN cable tools • Understand and document application Requirements • Generate I/O Summary & BOQ Prepare RFQs • Prepare & Read Job sheets • Prepare indents, invoices, and Maintenance logs. • Prepare Project management plan • Use MS Excel & MS Word for planning and Record keeping • Prepare As-built documentation, Ferrule list • Share and delegate of Tasks • Prepare Task Reports Prepare and email documents, reports, and escalation reports 	
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Sr. No.	Module	Key Learning Outcomes	Equipment
3.	<p>Coordination With Different Stakeholders</p> <p>Theory Duration (hh:mm) 30:00</p> <p>Practical Duration (hh:mm) 60:00</p> <p>Corresponding NOS Code IAS/N2002</p>	<p>Able to interact with client to:</p> <ul style="list-style-type: none"> • Understand stakeholders’ needs. • Identify solution options that meet client needs and present these to the client with pros and cons. • Enquire about integration scope and interfaces. • Develop detailed design of the solution, cost and time. • Finalize ordering in coordination with sales team. • Finalize specifications of the User Acceptance test. • Prepare Project Plan and share with the client. • Inform client about site requirements. • Coordinate installation and commissioning of the solution at site • Demonstrate the system performance at the site and get client report of acceptance. • Maintain communication with the client about usability and other issues and provide timely resolution. <p>Able to coordinate with the Sales team: Understand the client account, organization goals and high-level needs of the client.</p> <ul style="list-style-type: none"> • Identify and meet important stakeholders in the client organization • Identify solution options that meet client needs with pros and cons. • Provide technical specifications and the cost/time estimates. • Assist the sales team to win the order. • Share system performance at the site and client report of acceptance. • Share client feedback and resolve issues if any. • Coordinate with the sales team about service contract and AMC 	<p>Laptop, white board, marker, projector, MS Office / Open Office software, email, Printer</p>

		<p>Able to coordinate with other Teams and Departments in the Organization:</p> <ul style="list-style-type: none"> • Prepare detailed BOQ and share with the Purchase department. • Coordinate with the Purchase department to finalize vendors and subcontractors. • Share Project Specifications and Plan and with concerned departments/ groups in the organization such as Purchase, Fabrication, Assembly, Software, Testing and Documentation etc. • Receive parts and spares from stores and deposit unused material to stores. • Coordinate with the Integration and Testing team for factory inspection by client. • Coordinate installation and commissioning of the system at site. • Coordinate with Installation and Commissioning team for system performance test at site. • Coordinate with Installation and Commissioning team for the user training. • Share client feedback with all teams and resolve issues if any • Report problems identified in the field • Escalate customer concerns that are not being handled properly in the field • Resolve personnel issues • Receive feedback on work standards and customer satisfaction • Communicate any potential hazards at a particular location • Deliver work of expected quality despite constraints • Provide feedback to seniors about a happy or dissatisfied customer 	
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4.	<p>Health and Safety in Workplace Theory Duration (hh:mm) 15:00 Practical Duration (hh:mm) 15:00 Corresponding NOS Code IAS/N9002</p>	<p>Able to:</p> <ul style="list-style-type: none"> • Understand Safety Policy of the company and client • Follow procedures for handling Fire & Hazardous chemicals • Report Incidents • Use Fire Extinguishers A,B,C, • Follow ESD Procedures for handling electronic components • Use Safety Helmets, Ear plugs, Shoes, Gloves, goggles & Safety harnesses. • Use First aid for Electrical Shock & Burn victims • Perform Fire Drills & Evacuation procedures • Use helmet & Respect for Traffic rules • Understand and apply Health Policy • Understand and practice Posture, exercise & diet 	<p>Laptop, white board, marker, projector, Fire Drill accessories, First Aid kit, Protective Gear and accessories</p>
	<p>Employability skills Theory Duration (hh:mm) 30:00 Practical Duration (hh:mm) 30:00 Corresponding NOS Code <i>Mapped to DGT/VSQ/N0102</i></p>		
	<p>Introduction to Employability Skills Mapped to NOS 60 Hours (Version No. 1) Duration:1.5 Hours (1.5 Theory + 0 Practical)</p>	<ul style="list-style-type: none"> • Discuss the Employability Skills required for jobs in various industries • List different learning and employability related GOI and private portals and their usage 	<p>Laptop, white board, marker, projector</p>
	<p>Constitutional values – Citizenship Mapped to NOS 60 Hours (Version No. 1) Duration:1.5 Hours (1.5 Theory + 0 Practical)</p>	<ul style="list-style-type: none"> • 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 • Show how to practice different environmentally sustainable practices 	<p>Laptop, white board, marker, projector</p>

	<p>Becoming a Professional in the 21st Century Mapped to NOS 60 Hours (Version No. 1) Duration: 2.5 Hours (2.5 Theory + 0 Practical)</p>	<ul style="list-style-type: none"> • Discuss importance of relevant 21st century skills. • 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. • Describe the benefits of continuous learning 	<p>Laptop, white board, marker, projector</p>
	<p>Basic English Skills Mapped to NOS 60 Hours (Version No. 1) Duration: 10 Hours (5 Theory + 5 Practical)</p>	<ul style="list-style-type: none"> • Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Read and interpret text written in basic English • Write a short note/paragraph / letter/e - mail using basic English 	<p>Laptop, white board, marker, projector</p>
	<p>Career Development and Goal Setting Mapped to NOS 60 Hours (Version No. 1) Duration: 2 Hours (1 Theory + 1 Practical)</p>	<ul style="list-style-type: none"> • Create a career development plan with well-defined short- and long-term goals 	<p>Laptop, white board, marker, projector</p>
	<p>Communication skills Mapped to NOS 60 Hours (Version No. 1) Duration: 5 Hours (2 Theory + 3 Practical)</p>	<ul style="list-style-type: none"> • Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. • Explain the importance of active listening for effective communication • Discuss the significance of working collaboratively with others in a team 	<p>Laptop, white board, marker, projector</p>
	<p>Diversity and Inclusion Mapped to NOS 60 Hours (Version No. 1) Duration: 2.5 Hours (2.5 Theory+ 0 Practical)</p>	<ul style="list-style-type: none"> • Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD. • Discuss the significance of escalating sexual harassment issues as per POSH 	<p>Laptop, white board, marker, projector</p>

	<p>Financial and Digital Literacy Mapped to NOS 60 Hours (Version No. 1) Duration: 5 Hours (2 Theory+ 3 Practical)</p>	<ul style="list-style-type: none"> Outline the importance of selecting the right financial institution, product, and service. Demonstrate how to carry out offline and online financial transactions, safely and securely 	<p>Laptop, white board, marker, projector</p>
	<p>Essential Digital Skills Mapped to NOS 60 Hours (Version No. 1) Duration: 10 Hours (4 Theory+ 6 Practical)</p>	<ul style="list-style-type: none"> Describe the role of digital technology in today's life Demonstrate how to operate digital devices and use the associated applications and features, safely and securely. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely. Create sample word documents, excel sheets and presentations using basic features utilize virtual collaboration tools to work effectively 	<p>Laptop, white board, marker, projector</p>
	<p>Entrepreneurship Mapped to NOS 60 Hours (Version No. 1) Duration: 7 Hours (3 Theory+ 4 Practical)</p>	<ul style="list-style-type: none"> Explain the types of entrepreneurship and enterprises Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement Create a sample business plan, for the selected business opportunity 	<p>Laptop, white board, marker, projector</p>
	<p>Total Duration 570:00</p> <p>Theory Duration 150:00</p> <p>Practical Duration 300:00</p>	<p>Unique Equipment Required:</p> <ul style="list-style-type: none"> Laptop, white board, marker, projector Basic AC & DC Electrical & Electronics lab. Automation Lab which includes Ethernet LAN, PLC, SCADA, HMI, Field Devices, Sensors, Actuator, Control Valves, VFD, Cables – Wiring, Power, Coaxial, LAN, Fiber, Tools, Meters, Software Mechatronics Lab which included Pneumatic devices, switches, actuators, cylinders, control valves, compressor, piping, 	

	<p>OJT Duration 60:00 ES(Employability Skills) 60:00</p>	<p>hydraulic pump, ports, piping, control elements and accessories.</p> <ul style="list-style-type: none"> • Electrical safety accessories, Electrical switchgear, Conductivity meter, Earth pit and its components • Tool sets, Meter sets, Wires, Cables, Terminals, Sockets, Panels, Cable tray, Ferrules, Cable Glands, Supporting infrastructure • Meter sets, Wires, Cables, Terminals, Sockets, Supporting infrastructure • Fire Drill accessories, First Aid kit, Protective Gear, ESD accessories • AUTOCAD Software, MS Office / Open Office software, eMail, Printer, MS Project/Open Project ? • SCADA, PLC, Communication, Networking software
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Grand Total Course Duration: 570 Hours, 00 Minutes

Trainer Prerequisites for Job role: “Industrial Automation Specialist” mapped to Qualification Pack: “IAS/Q8005”

Sr. No.	Area	Details
1	Description	Industrial Automation Specialist provides solutions to automation problems for manufacturing and process industries. The individual is responsible for understanding user application, capturing these, proposing solution alternatives, writing technical specifications, designing, and assembling the system, testing, and providing technical support for installing and commissioning at customer site and ensure its powering up and proper operation. The individual provides post installation technical supports for the systems.
2	Personal Attributes	The individual must have interdisciplinary aptitude, pay attention to details, does logical thinking, and has ability to work within the factory and customer sites in a team environment and under deadlines.
3	Minimum Educational Qualifications	A.M.E/B.E. (Electrical, Electronics, Mechatronics, Instrumentation, or similar stream) OR B.E./B.Tech. (Electrical, Electronics, Mechatronics, Instrumentation, or similar stream) OR B.E./B.Tech. (Electrical, Electronics, Mechatronics, Instrumentation, or similar stream)
4a	Domain Certification	Certified for Job Role: “Industrial Automation Specialist” mapped to QP: “ <u>IAS/Q8005</u> ”. Minimum accepted score is 80%
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “ <u>MEP/Q0102</u> ”. Minimum accepted score is 70%.
5	Experience	A.M.E/B.E. (Electrical, Electronics, Mechatronics, Instrumentation, or similar stream) with 2 years’ industry experience and 1 year teaching experience OR B.E./B.Tech. (Electrical, Electronics, Mechatronics, Instrumentation or similar stream) with 2 years industry experience, 1 year teaching experience OR M.Sc. (Electronics or similar branch) with 3 years industrial experience and 1 year teaching experience.

