Model Curriculum

Junior Instrumentation Technician (Process Control)

Sector: **Instrumentation Automation Surveillance & Communication**

Sub-Sector: **Instrumentation**

Occupation: **Maintenance**

Ref ID: **IAS/Q3003**

List of NOS involved:

1. IAS/N0300 Site Readiness and Instrument Usability – Process Control
2. IAS/N0301 Preventive Maintenance – Process Control
3. IAS/N0103 Task reporting – Process Control
4. IAS/N0105 Safety, Health and Environment – Process Control
5. IAS/N2105 Work Effectively With Teams

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Junior Instrumentation Technician (Process Control)

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Junior Instrumentation Technician (Process Control)", in the "INSTRUMENTATION AUTOMATION SURVEILLANCE & COMMUNICATION" Sector/Industry and aims at building the following key competencies amongst the learner:

Program Name	**Junior Instrumentation Technician (Process Control)**		
Qualification Pack Name & Reference ID.	IAS/Q5001, V 1.0		
Version No.	1.0	**Version Update Date**	30/07/2019
Pre-requisites to Training	ITI – Instrumentation/Electrical/Electronics		
Training Outcomes	**After completing this programme, participants will be able to perform under supervision and guidance:** • Obtain Permits to work, Check Sheets & Formats • Follows plant working and instrumentation documents • Service Field Instrumentation, control loops and Control valves • Perform routine checks for On line Analyzers and Analyzer House • Identify and locate DCS & PLC devices • Locate and identify trouble in Package Units – Boilers, Heaters, Compressors, and Chillersetc. • Locate Fire and Gas Detection system and Maintain under guidance • Follow Site Hygiene guidelines of Field Installations – Visual , Integrity Checks and - Electrical Safety norms, House Keeping and Lighting • Monitor and maintain Consumables and perform follow-up • Obtain PM-work permit • Plan, Organize and perform PM-Preparatory tasks and schedules • Perform PM Visual Checks & Actions • Report faults, completed PM tasks, Corrective Maintenance tasks, unusual occurrence, theft and security breach • Maintain Basic Site Hygiene • Follow health and safety norms of the industry and the organization • Work effectively in a team		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of "Junior Instrumentation Technician (Process Control)" Qualification Pack issued by "Instrumentation Automation Surveillance & Communication Sector Skill Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Overview ofInstrumentation and Process Control** **Theory Duration** (hh:mm) 16:00 **Practical Duration** (hh:mm) 32:00 **Industry visit** (hh:mm) 08:00 **Corresponding NOS Code** IAS/N 0300 IAS/N 0301 IAS/N 0103 IAS/N 0105	• Familiarize with different types of sensors, instruments and control elements. • Familiarize with basic principles of measurement, connections and practices in process control. • Familiarize with standards, symbols and terminology used in process control. • Familiarize with the principles of control loops. • Familiarize with safety principles. • Familiarize with plant security practices. • Familiarize with different kinds of process industries, their unique characteristics and requirements.	Laptop, white board, marker, projector,Process Control lab, Industry visits
2	**Site Readiness and Instrument Usability – Process Control** **Theory Duration** (hh:mm) 16:00 **Practical Duration** (hh:mm) 32:00 **Industry visit** (hh:mm) 32:00 **Corresponding NOS Code** IAS/N0300	Able to: • Follow Process Plant related instructions and directives covering equipment, location, lay out, procedures, forms etc. • Follow the instructions and directives of various permits to work and uses the right one depending on the job he undertakes • Use Check sheets used in Instrumentation Maintenance work and makes entries. • Use Plant working document relevant to a particular Instrument tag/control loop he is working on, as required • Use document pertaining to a particular Instrument tag he/she is working with, as required • Attend to maintenance requests and resolves the problems. Requests for supervisor's advice and assistance during difficult problem resolution.	Laptop, white board, marker, projector, MS Office / Open office, Process Control lab, Industry visits

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Perform basic overhaul and testing under supervision of all standard types of control valves and accessories and can do basic overhaul and testing under supervision. • Carry out routine checks of on line Analyzers and Analyzer house. • Locate the field devices and identifies the interface units – able to work on the system with guidance. • Locate faults relating to operation of package units, location, relates instrument tags to respective Process package unit and undertakes routines and basic trouble shooting in these units. • Refer to overview of fire and gas detection, locates the main field devices, identifies interface units and performs maintenance work on the system with guidance. • Checks for visual damage and tampering • Checks for any visible loss of installation integrity. Integrity here means that the instrument and the installation is in a healthy working condition without any unusual appearance, breakage or foreign objects fallen in/on/around the installation which is likely to cause or lead to instrument malfunction. • Check for potential electrical problems due to deviation from standard electrical practices • Check for floor condition and cluttering of items • Check for lighting and their operation. Check for unsafe temporary wiring of lighting. • Check consumption and storage of consumables. • Complete follow up action as per assigned areas of responsibility and stipulated instructions. Items found unusual outside this boundary to be	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		reported to supervisor.	
3	**Preventive Maintenance – Process Control** **Theory Duration** (hh:mm) 16:00 **Practical Duration** (hh:mm) 24:00 **Industry visit** (hh:mm) 24:00 **Corresponding NOS Code** IAS/N0301	Able to: • Obtain Permit to Work. • Plan and organize for the day's Preventive Maintenance task. • Execute Preventivemaintenance jobs as per available Preventive Maintenance Schedule. • Prepare Process list from process supervisor. • Plan for next day's preventive maintenance schedule • Carry out-Visual Checks and action wherever possible or else transfer job to shut down list. • Complete preventive maintenance schedule list of control valve body, actuator and accessories. Close the issues in the list. • Collect and consolidate daily diagnostic messages from control valves which have a digital valve controller and record the same in either Preventive Maintenance list or Opportunistic shut down list for execution • Include preventive maintenance jobs during annual shut down or opportunistic shut down • Follow up on consolidated preventive maintenance list and close.	Laptop, white board, marker, projector, MS Office / Open office, Process Control lab, Industry visits
4	**Task reporting – Process Control** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 08:00 **Corresponding NOS Code** IAS/N0103	Able to: • Brief and Escalate faults/issues to immediate supervisor • Complete entry of preventive maintenance check lists/reports • Complete entry of Corrective Maintenance Check lists /reports • File report on noticing any visible changes in control valve installation or its accessories. Report for immediate attention of supervisor • Report any theft in control valve assembly/spares to supervisor • Report suspicious movement of new	Laptop, white board, marker, projector, MS Office / Open office, Data recording and communication equipment

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		persons near control valve installation to security and supervisor	
5	**Safety, Health and Environment – Process Control** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 08:00 **Corresponding NOS Code** IAS/N0105	Able to: • Interpret and follow formal Instructions from SHEDept. • Participate in the prescribed drills including familiarization of personal protective equipment, fire extinguisher and first aid. • Follow instructions on Work permit, Fire permit and Hazardous Area Classification, Fire and explosion hazards • Use right personal protective equipment • Support supervisor during SHE Audit	Laptop, white board, marker, projector, MS Office / Open office, Data recording and communication equipment, Fire Drill Accessories, First Aid Kit, Protective Equipment
6	**Work Effectively With Teams** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 08:00 **Corresponding NOS Code** IAS/N2105	Able to understand and practice: • Creating team environment • Communicating - giving and receiving • Working cooperatively • Participating in team decision making • Demonstrating Sense of Responsibility • Showing respect for opinions, customs and preferences	Laptop, white board, marker, projector, MS Office / Open Office software, email, Printer
	Total Duration **Theory Duration** **72:00** **Practical Duration** **112:00** **Industry visit** **64:00**	**Unique Equipment Required:** • Laptop, white board, marker, projector, • Process Control lab - including sensors for temperature, pressure, flow etc., actuators, control valves, limit switches, PID controller, meters, tools etc. • MS Office / Open office, • Data recording and communication equipment • Fire Drill Accessories, • First Aid Kit, • Protective Equipment • Industry visits	

Grand Total Course Duration: 248Hours, 00 Minutes

Trainer Prerequisites for Job role: "Junior Instrumentation Technician (Process Control)" mapped to Qualification Pack: "IAS/Q3003"

Sr. No.	Area	Details
1	**Description**	Junior Instrumentation Technician (Process Control) is employed in Process industries such as - Oil Refineries, Petrochemicals, Fertilizer Units, Power Plants Steel, Pharmaceuticals and other Process industries. Junior Instrumentation Technician (Process Control) carries out preventive maintenance, predictive maintenance and corrective maintenance under supervision and guidance. The duties involve Rotational Shifts/General Shifts, including major break downs and annual shut downs.
2	**Personal Attributes**	This job requires the individual to be disciplined, assertive, team player, possess analytical skills and problem solving ability, effective communicator and have the ability to work under pressure.
3	**Minimum Educational Qualifications**	12th pass
4a	**Domain Certification**	Certified for Job Role: "Junior Instrumentation Technician (Process Control)" mapped to QP: "IAS/Q3003". Minimum accepted score is 80%
4b	**Platform Certification**	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q0102". Minimum accepted score is 70%.
5	**Experience**	3 Years of relevant experience

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	**Junior Instrumentation Technician (Process Control)**
Qualification Pack	**IAS/Q3003**
Sector Skill Council	**INSTRUMENTATION AUTOMATION SURVEILLANCE & COMMUNICATION**

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be approved by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC

2. The assessment for the theory part will be based on knowledge bank of questions approved by the SSC

3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)

4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria

5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

				Marks Allocation	
Assessment Outcome	**Assessment Criteria**	**Total Marks (200+200+60+50+75)**	**Out of**	**Theory**	**Skills Practical**
1. IAS/N0300 Site Readiness and Instrument Usability – Process Control	PC1. Follow Process Plant related instructions and directives covering equipment, location, lay out, procedures, forms etc.	**200**	20	10	10
	PC2. Follow instructions and directives of various permits to work and uses the right one depending on the job he undertakes		10	5	5
	PC3. Use Check sheets used in Instrumentation Maintenance work and makes entries.		10	5	5
	PC 4. Use Plant working document relevant to a particular Instrument tag/control loop he is working on, as required		10	5	5
	PC5. Use document pertaining to a particular Instrument tag he/she is working with, as required		10	5	5
	PC6. Attend to maintenance requests and resolves the problems. Requests for supervisor's advice and assistance during difficult problem resolution.		20	5	15
	PC7. Perform basic overhaul and testing under supervision of all standard types of control valves and		10	5	5

	accessories and can do basic overhaul and testing under supervision.				
	PC8. Carry out routine checks of on line Analyzers and Analyzer house.		10	5	5
	PC9. Locate the field devices and identifies the interface units – able to work on the system with guidance.		10	5	5
	PC10. Locate faults relating to operation of package units, location, relates instrument tags to respective Process package unit and undertake routines and basic trouble shooting in these units.		10	5	5
	PC11. Refer to overview of fire and gas detection, locate the main field devices, identifies interface units and perform maintenance work on the system with guidance.		10	5	5
	PC12. Checks for visual damage and tampering		15	5	10
	PC13. Check for any visible loss of installation integrity. Integrity here means that the instrument and the installation is in a healthy working condition without any unusual appearance, breakage or foreign objects fallen in/on/around the installation which is likely to cause or lead to instrument malfunction.		15	5	10
	PC14. Check for potential electrical problems due to deviation from standard electrical practices		10	5	5
	PC15. Check for floor condition and cluttering of items		5	2	3
	PC16. Check for lighting and their operation. Check for unsafe temporary wiring of lighting.		5	2	3
	PC17. Check consumption and storage of consumables.		10	5	5
	PC 18. Complete follow up action as per assigned areas of responsibility and stipulated instructions. Items found unusual outside this boundary to be reported to supervisor.		10	5	5
		Total	**200**	**89**	**111**
2. IAS/N0301 Preventive Maintenance – Process Control	PC1. Obtain Permit to Work.		10	5	5
	PC2. Plans and organizes for the day's Preventive Maintenance task.		40	10	30
	PC3. Executes Preventive maintenance jobs as per available Preventive Maintenance Schedule.		20	10	10
	PC4. Prepares Process list from process supervisor.		20	10	10
	PC5. Plans for next day's preventive maintenance schedule	**200**			
	PC6. Carry out-Visual Checks and action wherever possible or else transfer job to shut down list.		30	10	20
	PC7. Complete preventive maintenance schedule list of control valve body, actuator and accessories. Close the issues in the list.		20	5	15

	PC8. Collect and consolidate daily diagnostic messages from control valves which have a digital valve controller and record the same in either Preventive Maintenance list or Opportunistic shut down list for execution		15	7	8
	PC9. Include preventive maintenance jobs during annual shut down or opportunistic shut down		25	10	15
	PC10. Follow up on consolidated preventive maintenance list and close.		20	5	15
	PC1. Brief and Escalate faults/issues to immediate supervisor	**Total**	200	72	128
3. IAS/N0103 Task reporting – Process Control	PC2. Complete entry of preventive maintenance check lists/reports	**60**	10	5	5
	PC3. Complete entry of Corrective Maintenance Check lists /reports		10	5	5
	PC4. File report on noticing any visible changes in control valve installation or its accessories. Report for immediate attention of supervisor		10	5	5
	PC5. Report any theft in control valve assembly/spares to supervisor		10	5	5
	PC6. Report suspicious movement of new persons near control valve installation to security and supervisor		10	5	5
		Total	**60**	**30**	**30**
4. IAS/N0105 Safety, Health and Environment – Process Control	PC1. Interpret and follow formal Instructions from SHEDept.	**50**	10	5	5
	PC2. Participate in the prescribed drills including familiarization of personal protective equipment, fire extinguisher and first aid.		10	5	5
	PC3. Follow instructions on Work permit, Fire permit and Hazardous Area Classification, Fire and explosion hazards		10	5	5
	PC4. Use right personal protective equipment		10	5	5
	PC5. Support supervisor during SHE Audit		10	5	5
		Total	**50**	**25**	**25**
5. IAS/N2105 Work Effectively With Teams	PC1. Know and understand the team objectives and goals	**75**	3	1	2
	PC2. Know team members by name. Greet them appropriately and respond to their greetings.		2	1	1
	PC3. Know the roles and responsibilities of team members. Ensure others know about you and your role in the team		2	1	1
	PC4. Learn about the culture and preferences of team members – especially if they belong to other organizations or nationalities		5	1	4
	PC5. Follow organization's policies and procedures		2	1	1

	for working with team members within and outside the organization – especially relating to privacy, confidentiality and security.			
	PC6. Create an environment of trust and mutual respect	3	1	2
	PC7. Use appropriate mode of communication – verbal, written, mail, phone or text and clearly articulate your message to ensure that the recipient understands the message.	2	1	1
	PC8. Listen to team members and try to understand what they are wanting to say. Seek or provide clarifications if you see any gap in understanding	3	1	2
	PC9. Communicate professionally and follow organization protocols. Do not overload the team members with unnecessary and unsolicited information	4	1	3
	PC10. Share important information with the team timely.	3	1	2
	PC11. Respond to communications promptly.	3	1	2
	PC12. Perform own role and produce output in time for other team members to consume	3	1	2
	PC13. Receive inputs from others and work upon it per role requirement	2	1	1
	PC14. Make adjustments within the permissible rules so that work flows smoothly.	2	1	1
	PC15. Help team members to perform their role effectively and provide any clarifications and support they need	2	1	1
	PC16. Share tools and common resources fairly, taking cognizance of others' needs and schedules	2	1	1
	PC17. Resolve any contentious issues amicably, involving the team lead or the supervisor if needed	2	1	1
	PC18. Let team members know in good time if you cannot carry out your commitments, explaining the reasons and alternate solutions, if any. Let the team lead know about this.	2	1	1
	PC19. Think positively and make constructive suggestions to meet the goals	2	1	1
	PC20. Accept and give suggestions with open mind	2	1	1
	PC21. Take initiatives and volunteer to contribute	2	1	1
	PC22. Help team members with facts and figures to arrive at workable decisions	2	1	1
	PC23. Accept decisions professionally and support these, even if these do not match your suggestions and personal views	4	1	3
	PC24. Act in the interest of the team and the organization to ensure that things do not 'fall through the gap' and team goals are achieved.	4	1	3

	PC25. Take initiative to correct the situation if something seems to be going wrong.		2	1	1
	PC26. Seek help or escalate if the situation demands		2	1	1
	PC27. Follow organization's and statutory guidelines about making references or comments to social customs or preferences		2	1	1
	PC28. Refrain from making any comments to hurt sentiments		2	1	1
	PC29. Accommodate team members' preferences to the extent feasible. If these come in the way of fulfilling team goals, discuss with the supervisor/ team leader.		2	1	1
	PC30. Seek information and clarifications from others if you do not understand any customs.		2	1	1
		Total	**75**	**30**	**45**