

Model Curriculum

Instrumentation Technician (Process Control)

**SECTOR: INSTRUMENTATION AUTOMATION SURVEILLANCE &
COMMUNICATION**

SUB-SECTOR : INSTRUMENTATION & AUTOMATION

OCCUPATION : OPERATION AND MAINTENANCE

REF ID : IAS/Q3102, V2.0

NSQF LEVEL : 4



Certificate

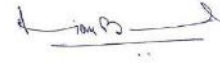
**CURRICULUM COMPLIANCE TO
QUALIFICATION PACK - NATIONAL OCCUPATION STANDARDS**

Is hereby issued by the
INSTRUMENTATION AUTOMATION SURVEILLANCE & COMMUNICATION SECTOR SKILL COUNCIL
For the
MODEL CURRICULUM

Complying of National Occupational Standards of
Job Role/Qualification Pack : '**Instrumentation Technician (Process Control)**' QP No. '**IAS/Q3102,V1.0 NSQF Level 4**'

Date of Issuance : May 02nd, 2019

Valid up to : May 01st, 2023



*Valid up to the next review date of the Qualification Pack

Authorised Signatory
(INSTRUMENTATION AUTOMATION SURVEILLANCE &
COMMUNICATION)

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Instrumentation Technician (Process Control)

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Instrumentation Technician (Process Control)”, in the “Instrumentation Automation Surveillance & Communication” Sector/Industry and aims at building the following key competencies amongst the learner.

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| Program Name | Instrumentation Technician (Process Control) | | |
| Qualification Pack Name & Reference ID. | IAS/Q3102, v2.0 | | |
| Version No. | 2.0 | Version Update Date | 22 th Aug. 2019 |
| Pre-requisites to Training | 10th + 1 year NTC or 1 year NAC in relevant field OR 10th + 1 year experience in relevant field OR Completed 1st year or pursuing 2nd year of 3 years Engineering Diploma (after 10th) in relevant field. OR Previous relevant Qualification of NSQF Level 3 + 1 year experience in relevant field | | |
| Training Outcomes | After completing this programme, participants will be able to: <ul style="list-style-type: none"> • Identify appropriate work permit, check sheets, formats, plant working and instrumentation documents. • Carryout basic overhaul and testing of field instrumentation, control loops and control valves • Carryout routine checks for online analyzers and analyzerhouse • Identify DCS & PLC devices • Identify fault in package units – boilers, heaters, compressors, and chillers etc. • Carryout predictive, corrective and shutdown maintenance • Carryout installation of instruments actuators and loop testing • Prepare report of completed PM tasks, corrective maintenance tasks, unusual occurrence etc. and faults report • Follow health and safety norms of the industry and the organization to ensure health and safety of self, others, asset and environment. • Work effectively in a team | | |

This course encompasses 7 out of 7 National Occupational Standards (NOS) of “Instrumentation Technician (Process Control)” Qualification Pack issued by “Instrumentation Automation Surveillance & Communication Sector Skill Council”.

| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|---|---|---|
| 1 | <p>Maintain site readiness and instrument usability as applicable for process control industry</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 20:00</p> <p>Corresponding NOS Code IAS/N3103</p> | <ul style="list-style-type: none"> Identify process plant related instructions and directives covering equipment, location, lay out, procedures, forms etc. Follow the instructions and directives of various permits to work. Use the right one depending on the job he/she undertakes. Identify check sheets used in Instrumentation Maintenance work. Identify plant working document relevant to a particular Instrument tag/control loop he is working on, as required. Identify document pertaining to a particular Instrument tag he/she is working with, as required Carryout basic overhaul and testing under supervision of all standard types of control valves and accessories. Carryout routine checks of online analyzers and analyzer house. Identify field devices and the interface units – able to work on the system. Identify faults relating to operation of package units, location, relates instrument tags to respective processpackage unit. Carryout routines and basic trouble shooting of package units. | <p>Laptop, white board, projector, Office</p> <p>white marker, MS</p> |

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| | | <ul style="list-style-type: none"> Identify fire and gas field devices, main field devices, interface units and performs maintenance work on the system. Identify the visible loss of installation integrity. Identify potential electrical problems due to deviation from standard electrical practices Assess the floor condition, lighting requirement and their operation. | |
| 2 | <p>Perform process control preventive maintenance</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 20:00</p> <p>Corresponding NOS Code IAS/N3104</p> | <ul style="list-style-type: none"> Identify the requirement of permit to work. Follow preventive maintenance jobs as per available preventive maintenance Schedule. Prepare process list from process supervisor. Prepare next day's preventive maintenance schedule Carryout visual checks and take corrective action wherever possible or else transfer job to shut down list. Follow preventive maintenance schedule list of field instrument, control valve, actuator and accessories. Analyze diagnostic messages from control valves which have a digital valvecontroller. Record the diagnostic messages in either preventive maintenance list or opportunistic shut down list for execution. Carryout preventive maintenance jobs during annual shut down or opportunistic shut down Prepare consolidated preventive maintenance list. | Laptop, white board, marker, projector, Model Control Panel with Instruments, Controllers, Devices, Sensors, Cables, Tools, Meters. |
| 3 | <p>Perform predictive, corrective and shutdown maintenance for process control</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm) 15:00</p> <p>Corresponding NOS Code IAS/N3106</p> | <ul style="list-style-type: none"> Follow predictive maintenance (PRM) plan. Follow corrective maintenance (CM) plan and schedule Identify CM needs and spares Carryout CM schedule Carryout planned & opportunistic shutdown maintenance Prepare corrective maintenance check list / report Prepare CM fault list / planned shutdown list. | Laptop, white board, marker, projector, MS Office |
| 4 | <p>Perform installation of instruments and loop testing as per instructions</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm) 15:00</p> <p>Corresponding NOS Code IAS/N3107</p> | <ul style="list-style-type: none"> Use appropriate work permit for installation and loop testing Follow installation procedure of instruments following industry best practices Prepare for loop testing – preparatory tasks Carryout loop test. Carryout any rework. Modify the loop | Laptop, white board, marker, projector, MS Office |

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| 5 | <p>Perform process control reporting tasks</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 20:00</p> <p>Corresponding NOS Code IAS/N3108</p> | <ul style="list-style-type: none"> Identify preventive maintenance check lists, corrective maintenance check list and reports Prepare report of any visible changes in control valve installation or its accessories. Prepare report of any theft in control valve assembly/spares. | <p>Laptop, white board, marker, projector, MS Office/ Data recording and communication equipment.</p> |
| 6 | <p>Work Effectively With Teams</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm) 15:00</p> <p>Corresponding NOS Code IAS/9001</p> | <ul style="list-style-type: none"> Coordinate effectively with team membersto achieve work objectives Communicate effectively with the team. Demonstrate active listening skills while communicating | <p>Laptop, white board, marker, projector, MS Office / Open office software, email, Printer</p> |
| 7 | <p>Health and Safety in Workplace</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm) 15:00</p> <p>Corresponding NOS Code IAS/N9002</p> | <ul style="list-style-type: none"> Illustrate the importance of safety and first aid. Identify the components of a basic first aid kit, safety tools, equipments. Administer basic first aid at the time of emergency. Demonstrate correct use of fire extinguishers at the time of emergency. Follow the general safety procedures as defined by the organization Follow electrical safety measures while operating electrical tools and RF equipment Illustrate practices for maintaining safe and secure workplace Participate in safety drills at workplace | <p>Laptop, white board, marker, projector, Fire Drill accessories, First Aid kit, Protective Gear, ESD accessories</p> |
| | <p>Employability skills</p> <p>Theory Duration (hh:mm) 30:00</p> <p>Practical Duration (hh:mm) 30:00</p> <p>Corresponding NOS Code <i>Mapped to DGT/VSQ/N0102</i></p> | <ul style="list-style-type: none"> | |

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| | <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> |

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| | <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> |

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| <p>Total Duration 390:00</p> <p>Theory Duration 90:00</p> <p>Practical Duration 120:00</p> <p>OJT 120:00</p> <p>ES (Employability Skills) 60:00</p> | <p>Unique Equipment Required:</p> <ul style="list-style-type: none"> • Laptop, white board, marker, projector, • Model Control Panel with Instruments, Controllers, Devices Sensors, switches, indicators, pushbuttons etc. • 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 • Fire Drill accessories, First Aid kit, Protective Gear, ESD accessories • AUTOCAD Software, MS Office / Open office software, email, Printer |
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Grand Total Course Duration: 390 Hours, 00 Minutes

(This Syllabus/ curriculum has been approved by Instrumentation Automation Surveillance & Communication Sector Skill Council of India)

Trainer Prerequisites for Job role: “Instrumentation Technician (Process Control)” mapped to Qualification Pack: “IAS/Q3102, v2.0”

| Sr. No. | Area | Details |
|---------|--|---|
| 1 | Description | Instrumentation Technician (Process Control) is employed in process industries such as - oil refineries, petrochemicals, fertilizer units, power plants steel, pharmaceuticals, and other process industries. Instrumentation Technician (Process Control) carries out duties related to operation, preventive maintenance and breakdown maintenance of instrumentation and control systems in process plants. Also capable of performing installation of instruments and actuators and perform Loop Test. |
| 2 | Personal Attributes | This job requires the individual to be disciplined, assertive, team player, possess analytical skills and problem-solving ability, effective communicator and could be able to work under pressure. |
| 3 | Minimum Educational Qualification | I.T.I (Instrumentation/Electrical / Electronic or similar trades) OR Diploma (Instrumentation/Electrical / Electronic or similar trades) |
| 4a | Domain Certification | Certified for job role: “Instrumentation Technician (Process Control)” mapped to QP: “IAS/Q3102, V2.0”. 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 80%. |
| 5 | Experience | I.T.I (Instrumentation/Electrical / Electronic or similar trades) with 2 year’s industrial experience and 1 year of teaching experience. OR Diploma (Instrumentation/Electrical/Electronic or similar trades) with 2 year’s industrial experience, 1 year of teaching experience. |

