Model Curriculum

QP Name: Digital Factory Automation engineer

QP Code: CSC/Q0415

Version: 1.0

NSQF Level: 5.5

Model Curriculum Version: 1.0

Capital Goods & Strategic Skill Council || 39, 1st Floor, Samyak Tower, Pusa Rd, Block 9A, WEA Karol Bagh, New Delhi – 110001 || email: ceo@cgssc.org

Table of Contents

Training Parameters

Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods, Defence Equipment, FireFighting & Safety Equipment
Occupation	Design
Country	India
NSQF Level	5.5
Aligned to NCO/ISCO/ISIC Code	2144.0403, 7412.0101
Minimum Educational Qualification and Experience	UG Degree in relevant field + 3 years of relevant experience or 3 Years UG Degree in Science and Technology (B.Sc / BCA) / 4 years BE, B.Tech (Electrical, Electronics, Mechanical, Mechatronics, Instrumentation and Control)* or 10th grade pass +3 years Diploma in relevant field + 4 year of relevant experience or Previous NSQC level 5 + 1.5 years of relevant experience *Subject to being offered as 6 months internship/ project
Pre-Requisite License or Training	NA
Minimum Job Entry Age	24 Years
Last Reviewed On	31st January 2024
Next Review Date	31st January 2027
NSQC Approval Date	31st January 2024
QP Version	1.0
Model Curriculum Creation Date	31st January 2024
Model Curriculum Valid Up to Date	30 January 2027
Model Curriculum Version	1.0
Minimum Duration of the Course	600 Hours
Maximum Duration of the Course	600 Hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills to:

- Define and explain the key concepts of digital factory automation.
- Demonstrate ability to use automation software tools for designing and simulating digital factory systems.
- Design and implement control systems for automated manufacturing processes.
- Design and program robotic systems for automation purposes.
- Implement security measures to protect automation systems from cyber attacks.
- Collect, analyze, and interpret data generated by automated systems.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
CSC/N0519: Assist to create a Digital Factory ecosystem **NOS Version- 1.0** **NSQF Level- 5.5**	**30:00**	**30:00**	**0:00**	**00:00**	**60:00**
Module 1: Introduction tothe role of a Digital Factory Automation Engineer	05:00	0:00	0:00	00:00	05:00
Module 2: Contribute to creating a Digital factory	25:00	30:00	0:00	00:00	55:00
CSC/N0522: Assist and perform system analysis, design and develop digital solution **NOS Version-1.0** **NSQF Level- 5.5**	**25:00**	**35:00**	**30:00**	**00:00**	**90:00**
Module 3: Assist and perform system analysis, design and develop digital solution	25:00	35:00	30:00	00:00	90:00
CSC/N0430: Execute Process control automation to enhance desired results **NOS Version- 1.0** **NSQF Level- 5.5**	**20:00**	**40:00**	**30:00**	**00:00**	**90:00**

Module 4: Execute Process control automation to enhance desired results	20:00	40:00	30:00	00:00	90:00
CSC/N0523: Optimize sensor and other devices as per process demand **NOS Version- 1.0** **NSQF Level- 5.5**	**15:00**	**45:00**	**30:00**	**00:00**	**90:00**
Module 5: Optimize sensor and other devices as per process demand	15:00	45:00	30:00	00:00	90:00
CSC/N0524: Assist in Installation, commissioning, and integration of robot system **NOS Version- 1.0** **NSQF Level- 5.5**	**40:00**	**80:00**	**0:00**	**00:00**	**120:00**
Module 6: Assist in Installation, commissioning, and integration of robot system	40:00	80:00	0:00	00:00	120:00
CSC/N0525: Assist in Connecting sensors and devices **NOS Version- 1.0** **NSQF Level- 5.5**	**20:00**	**40:00**	**0:00**	**00:00**	**60:00**
Module 7: Assist in Connecting sensors and devices	20:00	40:00	0:00	00:00	60:00
CSC/N0505: Health and Safety **NOS Version- 1.0** **NSQF Level- 5**	**10:00**	**20:00**	**0:00**	**00:00**	**30:00**
Module 8: Health and Safety	10:00	20:00	0:00	00:00	30:00
DGT/VSQ/N0102 - Employability Skills (60 hours) **NOS Version No. – 1.0** **NSQF Level – 5**	**20:00**	**40:00**	**00:00**	**00:00**	**60:00**
Module 9: Introduction to Employability Skills	20:00	40:00	00:00	00:00	60:00
Total Duration	**180:00**	**330:00**	**90:00**	**00:00**	**600:00**

Module Details

Module 1: Introduction to the role of a Digital Factory Automation Engineer

Bridge Module, mapped to CSC/N0519 v1.0

Terminal Outcomes:

- Discuss the job role of a Digital Factory Automation Engineer.

Duration: 05:00	**Duration: 0:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the size and scope of the capital good industry and its sub-sectors. • Discuss the role and responsibilities of a Digital Factory Automation Engineer. • Identify various employment opportunities for a Digital Factory Automation Engineer.	
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
NA	

Module 2: Contribute to creating a Digital factory

Bridge Module, mapped to CSC/N0519 v1.0

Terminal Outcomes:

- Provide inputs for architecting and implementing Industry 4.0 ready factory.
- Support and execute the intelligent implementation of the industry 4.0 plan for the industry.
- Participate in creating detailed engineering documentation
- Collaborate in Smart Planning, Design and Execution of manufacturing production plan
- Conduct one-to-one interactions with different stake holders of the organization with the pre-defined goals, roles and responsibilities.

Duration: 25:00	**Duration: 30:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define and explain the key principles and components of Industry 4.0. • Discuss the impact of digital disruptive manufacturing technologies on traditional factory setups. • Describe the necessary technologies and processes for creating a smart and agile manufacturing environment. • Discuss the importance and need to implement intelligent solutions for real-time monitoring, data analytics, and predictive maintenance. • Describe the need to integrate intelligent systems for demand forecasting, resource optimization, and adaptive production scheduling. • Explain the use of one-to-one interactions with stakeholders using predefined goals, roles, and responsibilities. • Elaborate innovative approaches to problem-solving within the context of digital factory automation.	• Implement Industry 4.0 technologies hands-on, such as IoT devices, sensors, and actuators. • Configure and deploy automation solutions to enhance manufacturing efficiency. • Integrate different Industry 4.0 components seamlessly for a cohesive digital factory ecosystem. • Troubleshoot and resolve integration issues to ensure smooth operation. • Participate actively in real-world scenarios of creating digital factories. • Collaborate with cross-functional teams to implement and adapt Industry 4.0 solutions. • Utilize data analytics tools to derive insights from production data. • Make informed decisions based on real-time analytics for continuous improvement. • Implement agile manufacturing practices in response to changing market demands. • Demonstrate the ability to make rapid adjustments to product designs, customization, and deliveries. • Apply an entrepreneurial mindset in problem-solving and decision-

	making. • Propose and implement innovative solutions to enhance the digital factory's performance. • Train team members on the principles and practices of Industry 4.0. • Facilitate the adoption of digital automation systems within the capital goods manufacturing environment.
Classroom Aids	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
PLC (Programmable Logic Controller), HMI (Human-Machine Interface), Industrial Sensors, Actuators and Motors, PLC Programming Software, Simulation Software, Industrial Networking Devices, Robotics Kit, Instrumentation and Control Devices, Toolkits, Safety glasses, gloves, and other safety equipment	

Module 3: Assist and perform system analysis, design and develop digital solution

Bridge Module, mapped to CSC/N0522 v1.0

Terminal Outcomes:

- Utilize appropriate tools and methods for Agile / Flexible / Lean manufacturing.
- Perform Plant Health Monitoring and Management
- Describe how to optimize production performance utilizing Tool Room.
- Demonstrate steps to monitor production line for performance and early signs of failure using data analysis tools

Duration: 25:00	**Duration: 35:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles of production planning and scheduling. • Discuss the importance of project management in machinery production. • Explain the relevance of monitoring techniques in enhancing productivity. • List appropriate tools and methods for each manufacturing approach. • Explain the advantages and limitations of Agile, Flexible, and Lean manufacturing. • Explain the role of quality management systems in machinery production. • Discuss the quality management systems adopted by the organization. • Describe the concept of plant health monitoring in the context of machinery production. • Discuss key parameters for monitoring the health of machinery. • Discuss strategies for the effective management of plant health. • Explain the role of the Tool Room in optimizing production performance. • List tools and techniques used for production optimization. • Describe optimization strategies to enhance machinery production	• Develop production plans based on adopted technologies and processes. • Utilize scheduling tools to create effective production schedules. • Monitor and adjust production schedules as needed. • Implement Agile, Flexible, and Lean manufacturing principles in real-world scenarios. • Utilize appropriate tools and methods to adapt to changing production requirements. • Evaluate the effectiveness of Agile, Flexible, and Lean strategies in specific contexts. • Contribute to the implementation of quality management systems. • Apply quality control methods to ensure the production of high-quality machinery. • Participate in quality audits and corrective action processes. • Set up and implement plant health monitoring systems. • Respond to plant health issues and implement corrective measures. • Develop preventive maintenance plans for machinery. • Utilize the Tool Room effectively to optimize production performance.

efficiency. • Describe the process of scheduling and programming robotic tools. • List data analysis tools for proactive monitoring of production line performance. • Discuss the importance of implementing preventive measures based on data-driven insights.	• Implement tools and techniques for production optimization. • Evaluate the impact of optimization strategies on machinery production. • Schedule and program robotic tools for efficient production. • Evaluate the performance of robotic tools in real-world production scenarios. • Implement adjustments to improve the efficiency of robotic tools. • Respond to production line issues in a timely and effective manner. • Collaborate with stakeholders to resolve production-related challenges. • Document and communicate issue resolution processes. • Utilize data analysis tools to monitor production line performance proactively. • Implement preventive measures based on data analysis insights. • Analyze the effectiveness of proactive monitoring in preventing failures. • Communicate deviations from production plans to relevant stakeholders. • Work collaboratively to restore normalcy and minimize production disruptions. • Document and communicate deviation management processes. • Identify areas for improvement in real-world production processes. • Communicate improvement suggestions to management and implement approved changes. • Participate actively in the adoption of new technologies for continuous improvement in machinery production.

Classroom Aids
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.
Tools, Equipment and Other Requirements
PLC (Programmable Logic Controller), HMI (Human-Machine Interface), Industrial Sensors, Actuators and Motors, PLC Programming Software, Simulation Software, Industrial Networking Devices, Robotics Kit, Instrumentation and Control Devices, Toolkits, Safety glasses, gloves, and other safety equipment

Module 4: Execute Process control automation solution

Bridge module, Mapped to CSC/N0430 v1.0

Terminal Outcomes:

- Implement plant control with PLC, HMI, SCADA, and other control systems
- Utilize different types of computer aided machining for achieving the planned outputs
- Integrate HVAC systems, ACCESS control systems, RFID based material movement systems in the plant.

Duration: 20:00	**Duration: 40:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define and explain the components of a distributed plant layout system. • Discuss the role of each component in the overall plant operation. • Discuss Design and implement Human-Machine Interface (HMI) systems for effective monitoring and control. • Describe how to configure and utilize Supervisory Control and Data Acquisition (SCADA) systems in plant automation. • Explain various computer-aided machining techniques and their applications in achieving planned manufacturing outputs. • Discuss how to Integrate Heating, Ventilation, and Air Conditioning (HVAC) systems into the plant automation for climate control. • Describe the process to Implement Access Control Systems to ensure secure entry and exit points within the plant. • Describe the process to Integrate Radio-Frequency Identification (RFID) based material movement systems for efficient tracking and handling. • Describe how to Develop strategies for establishing and maintaining relationships with vendors in the ecosystem. • Explain and adhere to industry regulations and safety standards	• Conduct an analysis of an existing plant layout, identifying areas for automation improvement. • Propose modifications to enhance the efficiency of the plant layout. • Develop a detailed architectural design for a distributed plant operation and control system. • Use software tools to create visual representations of the system architecture. • Program PLCs to control manufacturing processes based on given specifications. • Configure HMIs for real-time monitoring and control of plant operations. • Implement a SCADA system to monitor and control multiple processes within the plant. • Troubleshoot and address issues related to SCADA system performance. • Generate CNC programs using CAM software for specific machining projects. • Execute machining projects on programmable machines and evaluate the results. • Integrate HVAC, Access Control, and RFID-based material movement systems into the plant automation. • Conduct tests to ensure seamless

related to process control automation. • Describe safety features in the automation systems to ensure a secure working environment.	integration and troubleshoot any issues. • Simulate interactions with vendors to procure necessary components and services. • Evaluate and compare vendor offerings to make informed decisions. • Present the project, including design, implementation, and outcomes, to showcase practical skills.
Classroom Aids	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
PLC (Programmable Logic Controller), HMI (Human-Machine Interface), Industrial Sensors, Actuators and Motors, PLC Programming Software, Simulation Software, Industrial Networking Devices, Robotics Kit, Instrumentation and Control Devices, Toolkits, Safety glasses, gloves, and other safety equipment	

Module 5: Optimize sensor and other devices as per process demand

Bridge module, Mapped to CSC/N0523 v1.0

Terminal Outcomes:

- Apply IIoT standards and practices for creating IIoT architecture of the organization.
- Design and implement IIoT realization collaboratively using appropriate devices, connections, protocols, services, applications, and Cyber Security standards
- Verify correct implementation of IIoT and validate data, processed information, and analysis for correctness.

Duration: 15:00	**Duration: 45:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define the scope of IIoT implementation within an organization. • Discuss the application of industry-standard IIoT practices and protocols. • Discuss cybersecurity standards and best practices related to IIoT. • Discuss the need to Design and implement IIoT in collaboration with appropriate devices, connections, and protocols. • Discuss the use of cloud computing to refine and optimize process controls. • Discuss the importance of correct implementation of IIoT systems. • Describe how to Validate data, processed information, and analysis for accuracy and reliability. • Explain how to ensure IIoT systems comply with cybersecurity standards. • Describe how to implement measures to safeguard against potential cyber threats.	• conduct discussions to define the scope of IIoT implementation. • Engage with various stakeholders to gather requirements and expectations. • Apply industry-specific IIoT standards and practices in a practical setting. • Implement protocols for secure data communication. • Collaboratively design and implement IIoT architecture. • Show how to Configure and integrate devices, connections, and protocols in a practical environment. • Demonstrate how to develop methods to validate and verify data accuracy in IIoT systems. • Show how to implement tools or procedures for ongoing data validation. • Apply practical measures to ensure the cybersecurity of IIoT systems. • Demonstrate ways to respond to and mitigate cybersecurity threats in a simulated environment. • Perform setting up of monitoring systems for IIoT performance. • Show how to develop strategies to address and resolve production line issues based on IIoT data.

	• Practice responding to stakeholder requests regarding IIoT-related issues. • Show how to compile and communicate insights derived from IIoT data to relevant stakeholders.
Classroom Aids	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
PLC (Programmable Logic Controller), HMI (Human-Machine Interface), Industrial Sensors, Actuators and Motors, PLC Programming Software, Simulation Software, Industrial Networking Devices, Robotics Kit, Instrumentation and Control Devices, Toolkits, Safety glasses, gloves, and other safety equipment	

Module 6: Assist in Installation, commissioning, and integration of robot system

Bridge module, Mapped to CSC/N0524 v1.0

Terminal Outcomes:

- Perform robot installation, commissioning and setup
- Carry out calibration and mastering of robot
- Perform robot teaching and testing.

Duration: 40:00	Duration: 80:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define the key components involved in the installation of a robot system. • Explain the importance of adherence to safety protocols during the installation process. • Explain the environmental factors affecting the installation of a robot in a digital factory. • Describe the steps involved in commissioning a robot system. • Describe the role of calibration and mastering in the commissioning process. • Discuss potential challenges and solutions during the commissioning phase. • Explain the principles of creating obstacle-free robotic paths. • Explain different path planning algorithms and their applications. • Define the integration process of a robot controller into a digital factory automation system. • Discuss the communication protocols used for seamless integration. • Discuss the need to evaluate the compatibility of the robot controller with other components in the automation setup. • Discuss required skills for identifying and resolving common issues during installation and commissioning.	• Install robot components following safety guidelines and manufacturer specifications. • Configure hardware and software components for optimal performance. • Document the installation process, including any modifications made. • Perform calibration procedures to ensure accurate sensor and actuator readings. • Master the robot to establish a reference position and enhance precision. • Validate calibration and mastering results through practical tests. • Demonstrate the ability to teach the robot specific tasks and movements. • Conduct testing to verify the accuracy and repeatability of taught movements. • Troubleshoot and refine programming for improved efficiency. • Apply path planning principles to create obstacle-free paths for the robot. • Utilize simulation tools to test and optimize robot paths. • Implement real-time adjustments to paths based on practical considerations.

• Describe the process of performing diagnostic tests to ensure the functionality of the robot system. • Explain the need to interpret test results and implement necessary adjustments. • Describe safety standards and regulations applicable to robot systems. • Discuss the need to conduct safety audits during the installation and commissioning phases.	• Integration of Robot Controller into Automation System: • Integrate the robot controller with other automation components. • Establish communication protocols and ensure data exchange between systems. • Test the overall functionality and coordination of the integrated automation system. • Identify and resolve practical issues that may arise during installation and commissioning. • Develop a systematic approach to troubleshooting, including root cause analysis. • Document solutions and create a troubleshooting guide for future reference.
Classroom Aids	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
PLC (Programmable Logic Controller), HMI (Human-Machine Interface), Industrial Sensors, Actuators and Motors, PLC Programming Software, Simulation Software, Industrial Networking Devices, Robotics Kit, Instrumentation and Control Devices, Toolkits, Safety glasses, gloves, and other safety equipment	

Module 7: Assist in Connecting sensors and devices

Bridge module, Mapped to CSC/N0525 v1.0

Terminal Outcomes:

- Discuss information requirements at various decision-making points
- Determine capability and flexibility required in the analysis software
- Identify and implement suitable software for analysis and decision-making
- Test and verify correct processing and analysis of data

Duration: 20:00	**Duration**: 40:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the significance of information-driven decision-making in the context of a Digital Factory Automation engineer. • Describe and articulate information requirements at different decision-making points within a manufacturing process. • Discuss the capabilities and flexibility needed in analysis software for processing extensive data from sensors and devices. • Explain different types of analysis software suitable for big data processing, analytics, and AI applications. • Discuss the need to select appropriate software based on identified requirements. • Explain the principles of big data processing and analytics relevant to the field of capital goods manufacturing. • Describe application of data verification techniques to ensure accurate processing and analysis. • Describe the ways in which analyzed information can be utilized in decision-making processes within a digital factory. • Discuss strategies for integrating analyzed data into the manufacturing workflow for faster response to	• Conduct a real-world analysis of information requirements at specific decision-making points in a digital factory setting. • Document and present findings to highlight key information needs. • Perform a hands-on evaluation of different analysis software options, considering factors like scalability, real-time processing, and adaptability. • Implement the chosen software solution within a simulated digital factory environment. • Develop and execute test cases to verify the correctness of data processing and analysis. • Troubleshoot and rectify errors to ensure the reliability of the analysis software. • Integrate analyzed information into decision-making scenarios related to market demands and supply chain changes. • Demonstrate the impact of faster response times through the use of information-driven decision-making. • Apply selected visualization techniques to represent analyzed data effectively. • Create and present visualizations that aid decision-makers in understanding

market demands and supply chain changes. • Describe visualization techniques suitable for representing complex data generated by sensors and devices.	complex data patterns. • Reflect on the practical implementation, identifying areas of success and improvement. • Develop a plan for continuous improvement in the utilization of information-driven decision-making processes within the digital factory automation context. • Select appropriate visualization tools to effectively communicate analyzed information to stakeholders.
Classroom Aids	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
PLC (Programmable Logic Controller), HMI (Human-Machine Interface), Industrial Sensors, Actuators and Motors, PLC Programming Software, Simulation Software, Industrial Networking Devices, Robotics Kit, Instrumentation and Control Devices, Toolkits, Safety glasses, gloves, and other safety equipment	

Module 8: Maintain Health, Safety and Environment at workplace

Bridge module, Mapped to CSC/N0505 v1.0

Terminal Outcomes:

- Demonstrate ways to maintain personal health and safety.
- Describe the process of assisting in hazard management.
- Explain how to check the first aid box, firefighting and safety equipment.
- Describe the process of assisting in waste management.
- Explain the importance of following the fire safety guidelines.
- Explain the importance of following the emergency and first-aid procedures.
- Demonstrate the process of carrying out relevant documentation and review

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the recommended practicesto be followed to ensure protection from infections and transmission to others, such as the use of hand sanitizer and face mask. • Explain the importance and process of checking the work conditions, assessing the potential health and safety risks, and take appropriate measures to mitigate them. • Explain the importance and process of selecting and using the appropriatePPE relevant to the task and work conditions. • Explain the recommended techniques to be followed while lifting and moving heavy objects to avoid injury. • Explain the importance of following the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, toolsand equipment. • Explain the importance and process of identifying existing and potential hazards at work. • Describe the process of assessing the potential risks and injuries associated with the various hazards.	• Demonstrate the use of appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions. • Demonstrate how to handle hazardous materials safely. • Demonstrate the process of testing the firefighting and various safety equipment to ensure they are in usable condition. • Demonstrate the process of recycling and disposing different types of waste appropriately. • Demonstrate how to use the appropriate type of fire extinguisher to extinguish different types of fires safely. • Demonstrate how to administer appropriate first aid to the injured personnel. • Demonstrate the process of performing Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest. • Demonstrate the process of carrying out appropriate documentationnfollowing a health and safety incidentat work, including all the required information.

• Explain how to prevent or minimise different types of hazards. • Explain how to handle and store hazardous materials safely. • Explain the importance of ensuring the first aid box is updated with the relevant first aid supplies. • Describe the process of checking and testing the firefighting and various safety equipment to ensure they are in a usable condition. • Explain the criteria for segregating waste into appropriate categories. • Describe the appropriate methods for recycling the recyclable waste. • Describe the process of disposing of the non-recyclable waste safely and the applicable regulations. • Explain the use of different types of fire extinguishers to extinguish different types of fires. • State the recommended practices to be followed for a safe rescue during a fire emergency. • Explain how to request assistancefrom the fire department to extinguish a serious fire. • Explain the appropriate practices to be followed during workplace emergencies to ensure safety and minimise loss to organisational property. • State the common health and safety hazards present in a work environment, associated risks, and how to mitigate them. • State the safe working practices to be followed while working at various hazardous sites and using electrical equipment. • Explain the importance of ensuring easy access to firefighting and safety equipment. Explain the appropriate preventative and	

remedial actions to be taken in the case of exposure to toxic materials, such as poisonous chemicals and gases. • Explain various causes of fire in different work environments and the recommended precautions to be taken to prevent fire accidents. • Describe different methods of extinguishing fire. • List different materials used for extinguishing fire. • Explain the applicable rescue techniques to be followed during a fire emergency. • Explain the importance of placing safety signs and instructions at strategic locations in a workplace and following them. • Explain different types of first aid treatment to be provided for different types of injuries. • State the potential injuries associated with incorrect manual handling. • Explain how to move an injured person safely. • State various hazards associated with the use of various machinery, tools, implements, equipment and materials. • Explain the importance of ensuring no obstruction and free access to fire exits. • Explain how to free a person from electrocution safely. • Explain how to administer appropriate first aid to an injured person. • Explain how to perform Cardiopulmonary Resuscitation (CPR). • Explain the importance of coordinating with the emergency services to request urgent medical	

assistance for persons requiring professional medical attention or hospitalisation. State the appropriate documentation to be carried out following a health and safety incident at work, and the relevant information to be included. • Explain the importance and process of reviewing the health and safety conditions at work regularly or following an incident. • Explain the importance and process of implementing appropriate changesto improve the health and safety conditions at work.	
Classroom Aids	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
Personal Protective Equipment, Cleaning Equipment and Materials, Sanitizer, Soap, Mask	

Module 9: Employability Skills

Bridge module,Mapped to DGT/VSQ/N0102 -Employability Skills (60 hours) v1.0

Terminal Outcomes:

- Discuss the Employability Skills required for jobs in various industries
- 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
- Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan

Duration: ***20:00***	**Duration**: ***40:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the Employability Skills required for jobs in various industries • List different learning and employability related GOI and private portals and their usage • 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 • Discuss importance of relevant 21st century skills. • Describe the benefits of continuous learning. • Explain the importance of active listening for effective communication • Discuss the significance of working collaboratively with others in a team • Discuss the significance of escalating sexual harassment issues as per POSH act. • List the common components of salary and compute income, expenditure, taxes, investments etc. • Discuss the legal rights, laws, and aids • Describe the role of digital technology in today's life	• Practice different environmentally sustainable practices. • Exhibit 21st century skills like Self-Awareness, Behaviour 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. • Demonstrate 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 • Create a career development plan with well-defined short- and long-term goals • Communicate effectively using verbal and nonverbal communication etiquette. • Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD • Outline the importance of selecting the right financial institution, product, and service

• Discuss the significance of displaying responsible online behaviour while browsing, using various social media platforms, e-mails, etc., safely and securely • 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 • Detail the significance of analyzing different types and needs of customers • Explain the significance of identifying customer needs and responding to them in a professional manner. • Discuss the significance of maintaining hygiene and dressing appropriately • Explain the significance of maintaining hygiene and confidence during an interview • List the steps for searching and registering for apprenticeship opportunities	• Demonstrate how to carry out offline and online financial transactions, safely and securely • Operate digital devices and use the associated applications and features, safely and securely • Create sample word documents, excel sheets and presentations using basic features • Utilize virtual collaboration tools to work effectively • Devise a sample business plan, for the selected business opportunity • Create a professional Curriculum Vitae (CV) • Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively • Perform a mock interview
Classroom Aids:	
PPT, Laptop, White Board, Marker, Projector & Screen, Audio-visual, Chart paper, telephone connection, landline phone, and other required stationery.	
Tools, Equipment and Other Requirements	
Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below), Scanner cum Printer	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Degree	Degree in Mechanical/ Electronics/ Mechatronics Engineering	7	Digital Factory Automation Engineer	0		Practical skills and knowledge required in the relevant field

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "**Digital Factory Automation Engineer**"mapped to QP: "CSC/Q0415, v1.0". Minimum accepted score is 80%	Recommended that the Trainer is certified for the Job Role: "Trainer(VET and skills)", mapped to the Qualification Pack: "MEP/Q2601V3.0". Minimum accepted as per respective SSC guidelines is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Degree	Degreein Mechanical/ Electronics/ Mechatronics Engineering	7	Digital Factory Automatio n Engineer	0		Practical skills and knowledge required in the relevant field

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "**Digital Factory Automation Engineer**"mapped to QP: "CSC/Q0415, v1.0". Minimum accepted score is 80%	Recommended that the assessor is certified for the Job Role: "Assessor (VET and skills)", mapped to the Qualification Pack: "MEP/Q2701, v3.0", with a minimum score of 80%.

Assessment Strategy

1. Assessment System Overview:
    - Batches assigned to the assessment agencies for conducting the assessment on SDMS/SIP or email
    - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
    - The assessment agency deploys the ToA certified Assessor for executing the assessment
    - SSC monitors the assessment process & records
2. Testing Environment

    To ensure a conducive environment for conducting a test, the trainer will:
    - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
    - Check the duration of the training.
    - Check the Assessment Start and End time to be 10 a.m. and 5 p.m. respectively
    - Ensure there are 2 Assessors if the batch size is more than 30.
    - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
    - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
    - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
    - Check the availability of the Lab Equipment for the particular Job Role.
3. Assessment Quality Assurance levels / Framework:
    - Question papers created by the Subject Matter Experts (SME)
    - Question papers created by the SME verified by the other subject Matter Experts
    - Questions are mapped with NOS and PC
    - Question papers are prepared considering that levels 1 to 3 are for the unskilled & semi-skilled individuals, and levels 4 and above are for the skilled, supervisor & higher management
    - The assessor must be ToA certified and the trainer must be ToT Certified
    - The assessment agency must follow the assessment guidelines to conduct the assessment
4. Types of evidence or evidence-gathering protocol:
    - Time-stamped & geotagged reporting of the assessor from assessment location
    - Centre photographs with signboards and scheme-specific branding
    - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
    - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos
5. Method of verification or validation:

    To verify the details submitted by the training centre, the assessor will undertake:
    - A surprise visit to the assessment location
    - A random audit of the batch
    - A random audit of any candidate
6. Method for assessment documentation, archiving, and access

    To protect the assessment papers and information, the assessor will ensure:
    - Hard copies of the documents are stored

- Soft copies of the documents & photographs of the assessment are uploaded/accessed from Cloud Storage
- Soft copies of the documents & photographs of the assessment are stored on the Hard drive

References

Glossary

Term	Description
Declarative knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning	The key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on-site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on-site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	The terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
NOS	National Skills Qualification Committee
NSQF	National Skills Qualification Framework
OJT	On-the-Job Training
OMR	Optical Mark Recognition
PC	Performance Criteria
PwD	Persons with Disabilities
QP	Qualification Pack
SDMS	Skill Development & Management System
SIP	Skill India Portal
SSC	Sector Skill Council
TC	Trainer Certificate
ToA	Training of Assessors
ToT	Training of Trainers
TP	Training Provider