

Qualification Pack



Robotics and Automation COBOTS engineer

QP Code: CSC/Q0505

Version: 1.0

NSQF Level: 5.5

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CSC/Q0505: Robotics and Automation COBOTS engineer

Brief Job Description

Industry 4.0 disruptive technologies that includes the robotics, automation with special focus on collaborative robots in short called as COBOTS are game changer for smart digital manufacturing. Cobots play a vital role in digital manufacturing especially in shop floor productions. Cobots is the need of the hour. The individual is expected to develop expertise on the basics and concepts of cobots, architecture, anatomy, installation, commissioning and configuring and application in manufacturing. He / She develop hands-on experience in programming using ROS (Robot Operating Systems).

Personal Attributes

The person develops keen interest in learning, reskilling and upskilling on technical, analytical and programming skills thereby connecting the Human-Machine interface through Industrial Internet of Things (IIoT). Additionally they develop Interpersonal Skills, communication, presentation entrepreneurial skills and also develop team building skills. The individual must be well-equipped with knowledge, skills & carry out standard & non-standard practices as per the requirement of the job role. They must learn the project management skills (PM) as well.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [CSC/N0521: Assist in designing, Programming, and maintaining industrial robotic systems.](#)
2. [CSC/N0513: Perform Installation, commissioning, and integration of robotic systems](#)
3. [CSC/N0514: Carry out Robot Operating Systems \(ROS\) programming of Robots and COBOTS](#)
4. [CSC/N0520: Configure robotic movements, troubleshoot and prevent malfunction](#)
5. [CSC/N1339: Collaboratively coordinate with the team](#)
6. [CSC/N0505: Follow health, safety and environment guidelines at workplace](#)
7. [DGT/VSQ/N0102: Employability Skills \(60 Hours\)](#)

Qualification Pack (QP) Parameters

| | |
|---------------|---------------|
| Sector | Capital Goods |
|---------------|---------------|

Qualification Pack

| | |
|---|--|
| 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, Fire-Fighting & Safety Equipment |
| Occupation | Service |
| Country | India |
| NSQF Level | 5.5 |
| Credits | 19 |
| Aligned to NCO/ISCO/ISIC Code | NCO/2015 |
| Minimum Educational Qualification & Experience | UG in relevant field (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) |
| Minimum Level of Education for Training in School | |
| Pre-Requisite License or Training | NA |
| Minimum Job Entry Age | 24 Years |
| Last Reviewed On | NA |
| Next Review Date | 31/01/2027 |
| NSQC Approval Date | 31/01/2024 |
| Version | 1.0 |
| Reference code on NQR | QG-5.5-CG-02041-2024-V1-CGSC |
| NQR Version | 1 |

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CSC/N0521: Assist in designing, Programming, and maintaining industrial robotic systems.

Description

The role of assisting in the design, programming, and maintenance of industrial robot systems involves collaborating with engineers to design robotic systems, programming robots for specific tasks, and maintaining their functionality. This includes troubleshooting issues, implementing upgrades, and ensuring compliance with safety standards.

Scope

The scope covers the following :

- The scope of assisting in the design, programming, and maintenance of industrial robot systems includes collaborating on system design, programming robots for specific tasks, performing maintenance to ensure functionality, troubleshooting issues, and ensuring compliance with safety standards. This role requires a strong understanding of robotics, programming skills, attention to detail, and the ability to work effectively in a team.

Elements and Performance Criteria

Assist in Design, Program, and Maintain industrial Robot system

To be competent, the user/individual on the job must be able to:

- PC1.** Ensure the robot design meets the required precision and accuracy for the intended tasks.
- PC2.** Verify that the robot's kinematics and dynamics are suitable for the application.
- PC3.** Confirm that the robot's payload capacity and reach are appropriate for the tasks it will perform.
- PC4.** Optimize the design to handle a variety of workpieces or tools
- PC5.** Design the robot system to be adaptable to different production scenarios and tasks.
- PC6.** Ensure ease of reprogramming and reconfiguration for changing production needs.
- PC7.** Incorporate safety features to comply with industry standards and regulations.
- PC8.** Implement measures to prevent collisions and ensure safe human-robot collaboration.
- PC9.** Optimize the design for energy efficiency to reduce operational costs
- PC10.** Consider the use of energy recovery systems where applicable.
- PC11.** Design components that are easily accessible for maintenance and replacement.
- PC12.** Include self-diagnostic features to aid in troubleshooting.
- PC13.** Provide a user-friendly programming interface for ease of use.
- PC14.** Support both graphical and text-based programming to accommodate different user preferences.
- PC15.** Implement efficient path planning algorithms to optimize robot movements.
- PC16.** Minimize cycle times while ensuring smooth and collision-free trajectories.
- PC17.** Enable seamless integration with other automation systems and machinery.
- PC18.** Ensure synchronization with the overall production line for enhanced efficiency.

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- PC19.** Develop robust error handling mechanisms to address unexpected situations.
- PC20.** Provide options for quick recovery from errors to minimize downtime.
- PC21.** Implement predictive maintenance algorithms to anticipate component failures.
- PC22.** Monitor critical components and schedule maintenance based on actual usage and wear.
- PC23.** Enable remote monitoring and diagnostics to facilitate quick troubleshooting.
- PC24.** Incorporate connectivity features for remote software updates and maintenance.
- PC25.** Provide comprehensive documentation for maintenance procedures.
- PC26.** Offer training programs for maintenance personnel to ensure proper handling and troubleshooting.
- PC27.** Establish a feedback mechanism to collect data on system performance and issues.
- PC28.** Use feedback for continuous improvement and future design iterations.
- PC29.** Ensure the robot design meets the required precision and accuracy for the intended tasks.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** organizational policies, procedures, and guidelines that relate to designing and maintaining networks
- KU2.** software and system configuration
- KU3.** robot anatomy and operating system
- KU4.** installation process includes robot mounting, wiring standards, routing, safety peripherals and tool integration
- KU5.** robot integration with automation elements like electro pneumatics and hydraulics, electrical components like circuit breakers, push buttons, sensors, relay, contactor, indicators, buzzer, motor conveyor, PLC, VFD, HMI
- KU6.** robot mastering, types and different conditions to do mastering
- KU7.** teach pendant controls and displays
- KU8.** robot programming methods, instructions using teach pendant and simulation tools
- KU9.** industry standards like safety device and its rating, wire and cable size capacity, connector types

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** follow instructions, guidelines, procedures, rules, and service level agreements
- GS2.** listen effectively and communicate information accurately
- GS3.** follow rule-based decision-making processes
- GS4.** make decisions on suitable courses
- GS5.** plan and organize the work to achieve targets and meet deadlines
- GS6.** apply problem-solving approaches to different situations
- GS7.** analyse the business impact and disseminate relevant information to others



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GS8. apply balanced judgments to different situations

GS9. check the work is complete and free from errors

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Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Assist in Design, Program, and Maintain industrial Robot system</i> | 30 | 70 | - | - |
| PC1. Ensure the robot design meets the required precision and accuracy for the intended tasks. | - | - | - | - |
| PC2. Verify that the robot's kinematics and dynamics are suitable for the application. | - | - | - | - |
| PC3. Confirm that the robot's payload capacity and reach are appropriate for the tasks it will perform. | - | - | - | - |
| PC4. Optimize the design to handle a variety of workpieces or tools | - | - | - | - |
| PC5. Design the robot system to be adaptable to different production scenarios and tasks. | - | - | - | - |
| PC6. Ensure ease of reprogramming and reconfiguration for changing production needs. | - | - | - | - |
| PC7. Incorporate safety features to comply with industry standards and regulations. | - | - | - | - |
| PC8. Implement measures to prevent collisions and ensure safe human-robot collaboration. | - | - | - | - |
| PC9. Optimize the design for energy efficiency to reduce operational costs | - | - | - | - |
| PC10. Consider the use of energy recovery systems where applicable. | - | - | - | - |
| PC11. Design components that are easily accessible for maintenance and replacement. | - | - | - | - |
| PC12. Include self-diagnostic features to aid in troubleshooting. | - | - | - | - |
| PC13. Provide a user-friendly programming interface for ease of use. | - | - | - | - |
| PC14. Support both graphical and text-based programming to accommodate different user preferences. | - | - | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| PC15. Implement efficient path planning algorithms to optimize robot movements. | - | - | - | - |
| PC16. Minimize cycle times while ensuring smooth and collision-free trajectories. | - | - | - | - |
| PC17. Enable seamless integration with other automation systems and machinery. | - | - | - | - |
| PC18. Ensure synchronization with the overall production line for enhanced efficiency. | - | - | - | - |
| PC19. Develop robust error handling mechanisms to address unexpected situations. | - | - | - | - |
| PC20. Provide options for quick recovery from errors to minimize downtime. | - | - | - | - |
| PC21. Implement predictive maintenance algorithms to anticipate component failures. | - | - | - | - |
| PC22. Monitor critical components and schedule maintenance based on actual usage and wear. | - | - | - | - |
| PC23. Enable remote monitoring and diagnostics to facilitate quick troubleshooting. | - | - | - | - |
| PC24. Incorporate connectivity features for remote software updates and maintenance. | - | - | - | - |
| PC25. Provide comprehensive documentation for maintenance procedures. | - | - | - | - |
| PC26. Offer training programs for maintenance personnel to ensure proper handling and troubleshooting. | - | - | - | - |
| PC27. Establish a feedback mechanism to collect data on system performance and issues. | - | - | - | - |
| PC28. Use feedback for continuous improvement and future design iterations. | - | - | - | - |
| PC29. Ensure the robot design meets the required precision and accuracy for the intended tasks. | - | - | - | - |
| NOS Total | 30 | 70 | - | - |

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National Occupational Standards (NOS) Parameters

| | |
|----------------------------|--|
| NOS Code | CSC/N0521 |
| NOS Name | Assist in designing, Programming, and maintaining industrial robotic systems. |
| 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, Ship Building & Repair, Fire-Fighting & Safety Equipment, Homeland Security |
| Occupation | Service |
| NSQF Level | 5.5 |
| Credits | 2 |
| Version | 1.0 |
| Last Reviewed Date | 31/01/2024 |
| Next Review Date | 31/01/2027 |
| NSQC Clearance Date | 31/01/2024 |

Qualification Pack

CSC/N0513: Perform Installation, commissioning, and integration of robotic systems

Description

This NOS unit is about performing tasks related to robot installation, commissioning and teaching. It is also about creating obstacle free robotic paths and integrating robot controller for actual parameters.

Scope

The scope covers the following :

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

Elements and Performance Criteria

Perform robot installation, commissioning and setup

To be competent, the user/individual on the job must be able to:

- PC1.** install robot controller, licenses, tool, sensors and pneumatics into the system by following organisational procedures
- PC2.** integrate robot controller and robot as per SOP and design document
- PC3.** integrate safety fencing and controller panel as per SOP and design document
- PC4.** turn on the power of robot, do first operation, look for any warnings/errors in it and rectify the same as per organisational guidelines
- PC5.** check for sensors and external device connections with controller in case of any malfunction or no operation

Carry out calibration and mastering of robot

To be competent, the user/individual on the job must be able to:

- PC6.** execute mastering for all servos by following organisational procedures
- PC7.** define the global and local points (Home and Home 2) as per SOP
- PC8.** carry out tool configuration and data mapping in the system as per SOP
- PC9.** fix the TCP and mount the frame on tool as per design and project document
- PC10.** calibrate base of tool and record the readings for future reference

Perform robot teaching and testing

To be competent, the user/individual on the job must be able to:

- PC11.** insert instructions in the robotic system to execute teaching process
- PC12.** program the robot as per the path required for using point to point control system with necessary instructions
- PC13.** perform dry-run of the robot to check its functioning
- PC14.** perform all necessary tests and procedures required as per industry standards
- PC15.** override testing and motion types

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PC16. create collision free path of the robot

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** organizational policies, procedures, and guidelines that relate to designing and maintaining networks
- KU2.** software and system configuration
- KU3.** robot anatomy and operating system
- KU4.** EOAT anatomy and pneumatic systems
- KU5.** calibration and mastering processes
- KU6.** accuracy, speed and motion of robot
- KU7.** mechanism of linear and circular motion types
- KU8.** motion and time taken for different activities

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** follow instructions, guidelines, procedures, rules, and service level agreements
- GS2.** listen effectively and communicate information accurately
- GS3.** follow rule-based decision-making processes
- GS4.** make decisions on suitable courses
- GS5.** plan and organize the work to achieve targets and meet deadlines
- GS6.** apply problem-solving approaches to different situations
- GS7.** analyse the business impact and disseminate relevant information to others
- GS8.** apply balanced judgments to different situations
- GS9.** check the work is complete and free from errors

Qualification Pack

Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Perform robot installation, commissioning and setup</i> | 10 | 17 | - | - |
| PC1. install robot controller, licenses, tool, sensors and pneumatics into the system by following organisational procedures | 2 | 3 | - | - |
| PC2. integrate robot controller and robot as per SOP and design document | 2 | 4 | - | - |
| PC3. integrate safety fencing and controller panel as per SOP and design document | 2 | 3 | - | - |
| PC4. turn on the power of robot, do first operation, look for any warnings/errors in it and rectify the same as per organisational guidelines | 2 | 4 | - | - |
| PC5. check for sensors and external device connections with controller in case of any malfunction or no operation | 2 | 3 | - | - |
| <i>Carry out calibration and mastering of robot</i> | 14 | 20 | - | - |
| PC6. execute mastering for all servos by following organisational procedures | 3 | 4 | - | - |
| PC7. define the global and local points (Home and Home 2) as per SOP | 3 | 4 | - | - |
| PC8. carry out tool configuration and data mapping in the system as per SOP | 3 | 4 | - | - |
| PC9. fix the TCP and mount the frame on tool as per design and project document | 3 | 4 | - | - |
| PC10. calibrate base of tool and record the readings for future reference | 2 | 4 | - | - |
| <i>Perform robot teaching and testing</i> | 16 | 23 | - | - |
| PC11. insert instructions in the robotic system to execute teaching process | 3 | 4 | - | - |
| PC12. program the robot as per the path required for using point to point control system with necessary instructions | 3 | 4 | - | - |

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| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| PC13. perform dry-run of the robot to check its functioning | 3 | 4 | - | - |
| PC14. perform all necessary tests and procedures required as per industry standards | 2 | 3 | - | - |
| PC15. override testing and motion types | 3 | 4 | - | - |
| PC16. create collision free path of the robot | 2 | 4 | - | - |
| NOS Total | 40 | 60 | - | - |

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National Occupational Standards (NOS) Parameters

| | |
|----------------------------|--|
| NOS Code | CSC/N0513 |
| NOS Name | Perform Installation, commissioning, and integration of robotic systems |
| 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, Ship Building & Repair, Fire-Fighting & Safety Equipment, Homeland Security |
| Occupation | Service |
| NSQF Level | 5.5 |
| Credits | 4 |
| Version | 1.0 |
| Last Reviewed Date | 31/01/2024 |
| Next Review Date | 31/01/2027 |
| NSQF Clearance Date | 31/01/2024 |

Qualification Pack

CSC/N0514: Carry out Robot Operating Systems (ROS) programming of Robots and COBOTS

Description

This NOS unit is about performing tasks related to robot installation, commissioning and teaching. It is also about creating obstacle free robotic paths and integrating robot controller for actual parameters.

Scope

The scope covers the following :

- Robot programming and parameterization
- Carry out application testing and dry run
- Operate robot on different modes

Elements and Performance Criteria

Robot programming and parameterization

To be competent, the user/individual on the job must be able to:

- PC1.** insert the instructions and define sequence of multiple paths/operation of the robot
- PC2.** modify path to achieve cycle time
- PC3.** assign application parameters in the program
- PC4.** create logics and insert variables for logical programming of the robot

Carry out application testing and dry run

To be competent, the user/individual on the job must be able to:

- PC5.** define parameters of robot application (welding/material handling)
- PC6.** connect application controllers with robot controller as per the layout diagram and robot manual
- PC7.** estimate the process path and cycle time as per production requirements
- PC8.** perform dry run of the robot on the job to check it functioning
- PC9.** fine tune the robot program with required cycle time and finalize the program

Operate robot on different modes

To be competent, the user/individual on the job must be able to:

- PC10.** check for safety door and interlocking systems for proper functioning
- PC11.** check safety fencing for proper functioning by applying T2 or AUT mode
- PC12.** perform dry run of robot on different operating modes
- PC13.** execute each operation on real job with all systems active
- PC14.** document the results in required formats by following organizational procedures

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

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- KU1.** organizational policies, procedures, and guidelines that relate to designing and maintaining networks
- KU2.** software and system configuration
- KU3.** robot anatomy and operating system
- KU4.** installation process includes robot mounting, wiring standards, routing, safety peripherals and tool integration
- KU5.** robot integration with automation elements like electro pneumatics and hydraulics, electrical components like circuit breakers, push buttons, sensors, relay, contactor, indicators, buzzer, motor conveyor, PLC, VFD, HMI
- KU6.** robot mastering, types and different conditions to do mastering
- KU7.** teach pendant controls and displays
- KU8.** robot programming methods, instructions using teach pendant and simulation tools
- KU9.** industry standards like safety device and its rating, wire and cable size capacity, connector types

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** follow instructions, guidelines, procedures, rules, and service level agreements
- GS2.** listen effectively and communicate information accurately
- GS3.** follow rule-based decision-making processes
- GS4.** make decisions on suitable courses
- GS5.** plan and organize the work to achieve targets and meet deadlines
- GS6.** apply problem-solving approaches to different situations
- GS7.** analyse the business impact and disseminate relevant information to others
- GS8.** apply balanced judgments to different situations
- GS9.** check the work is complete and free from errors

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Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Robot programming and parameterization</i> | 12 | 19 | - | - |
| PC1. insert the instructions and define sequence of multiple paths/operation of the robot | 3 | 4 | - | - |
| PC2. modify path to achieve cycle time | 3 | 5 | - | - |
| PC3. assign application parameters in the program | 3 | 5 | - | - |
| PC4. create logics and insert variables for logical programming of the robot | 3 | 5 | - | - |
| <i>Carry out application testing and dry run</i> | 15 | 23 | - | - |
| PC5. define parameters of robot application (welding/material handling) | 3 | 4 | - | - |
| PC6. connect application controllers with robot controller as per the layout diagram and robot manual | 4 | 5 | - | - |
| PC7. estimate the process path and cycle time as per production requirements | 3 | 5 | - | - |
| PC8. perform dry run of the robot on the job to check it functioning | 2 | 4 | - | - |
| PC9. fine tune the robot program with required cycle time and finalize the program | 3 | 5 | - | - |
| <i>Operate robot on different modes</i> | 13 | 18 | - | - |
| PC10. check for safety door and interlocking systems for proper functioning | 3 | 4 | - | - |
| PC11. check safety fencing for proper functioning by applying T2 or AUT mode | 3 | 5 | - | - |
| PC12. perform dry run of robot on different operating modes | 2 | 3 | - | - |
| PC13. execute each operation on real job with all systems active | 2 | 3 | - | - |

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| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| PC14. document the results in required formats by following organizational procedures | 3 | 3 | - | - |
| NOS Total | 40 | 60 | - | - |

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National Occupational Standards (NOS) Parameters

| | |
|----------------------------|--|
| NOS Code | CSC/N0514 |
| NOS Name | Carry out Robot Operating Systems (ROS) programming of Robots and COBOTS |
| 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, Ship Building & Repair, Fire-Fighting & Safety Equipment, Homeland Security |
| Occupation | Service |
| NSQF Level | 5.5 |
| Credits | 4 |
| Version | 1.0 |
| Last Reviewed Date | 31/01/2024 |
| Next Review Date | 31/01/2027 |
| NSQC Clearance Date | 31/01/2024 |

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CSC/N0520: Configure robotic movements, troubleshoot and prevent malfunction

Description

The role of configuring robot movements, troubleshooting, and preventing malfunctions involves programming and fine-tuning robot motions for optimal performance. This includes identifying and resolving issues that may arise during robot operation, such as mechanical failures or programming errors.

Scope

The scope covers the following :

- The scope of configuring robot movements, troubleshooting, and preventing malfunctions includes programming and optimizing robot motions, diagnosing and resolving operational issues, implementing preventive maintenance measures, ensuring compliance with safety regulations, and providing training and support to personnel. This role is essential for maintaining the efficient and safe operation of robotic systems in various industries.

Elements and Performance Criteria

Configure robot movements, troubleshoot and prevent malfunction

To be competent, the user/individual on the job must be able to:

- PC1.** Achieve and maintain the required precision and accuracy in robot movements.
- PC2.** Configure the robot to execute tasks with high repeatability.
- PC3.** Program the COBOT to handle a range of tasks and workpieces.
- PC4.** Ensure flexibility in movement configurations to accommodate varying production needs.
- PC5.** Implement and fine-tune collaborative features for safe human-robot interaction.
- PC6.** Verify that the COBOT can adapt its movements when working alongside human operators.
- PC7.** Demonstrate the ability to diagnose and identify issues in the COBOT's programming or hardware.
- PC8.** Utilize diagnostic tools effectively to pinpoint and resolve problems.
- PC9.** Conduct thorough root cause analysis for malfunctions, considering both software and hardware aspects.
- PC10.** Develop strategies to address recurring issues and prevent future occurrences.
- PC11.** Respond promptly to reported malfunctions and implement timely resolutions.
- PC12.** Minimize downtime by efficiently addressing programming or operational issues.
- PC13.** Analyze historical troubleshooting data to identify patterns and areas for improvement.
- PC14.** Propose and implement enhancements to prevent similar issues in the future
- PC15.** Develop and implement preventive maintenance programs for the COBOT's programming.
- PC16.** Schedule routine checks and updates to ensure optimal performance.
- PC17.** Incorporate error-proofing mechanisms in the programming to prevent common mistakes.
- PC18.** Implement safeguards to minimize the impact of operator errors on the robot's performance.

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PC19. Ensure that the COBOT's movements comply with safety standards and regulations.

PC20. Implement safety features to prevent collisions and ensure safe collaboration with human workers.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organizational policies, procedures, and guidelines that relate to designing and maintaining networks

KU2. software and system configuration

KU3. robot anatomy and operating system

KU4. installation process includes robot mounting, wiring standards, routing, safety peripherals and tool integration

KU5. robot integration with automation elements like electro pneumatics and hydraulics, electrical components like circuit breakers, push buttons, sensors, relay, contactor, indicators, buzzer, motor conveyor, PLC, VFD, HMI

KU6. robot mastering, types and different conditions to do mastering

KU7. teach pendant controls and displays

KU8. robot programming methods, instructions using teach pendant and simulation tools

KU9. industry standards like safety device and its rating, wire and cable size capacity, connector types

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. follow instructions, guidelines, procedures, rules, and service level agreements

GS2. listen effectively and communicate information accurately

GS3. follow rule-based decision-making processes

GS4. make decisions on suitable courses

GS5. plan and organize the work to achieve targets and meet deadlines

GS6. apply problem-solving approaches to different situations

GS7. analyse the business impact and disseminate relevant information to others

GS8. apply balanced judgments to different situations

GS9. check the work is complete and free from errors

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Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Configure robot movements, troubleshoot and prevent malfunction</i> | 30 | 70 | - | - |
| PC1. Achieve and maintain the required precision and accuracy in robot movements. | - | - | - | - |
| PC2. Configure the robot to execute tasks with high repeatability. | - | - | - | - |
| PC3. Program the COBOT to handle a range of tasks and workpieces. | - | - | - | - |
| PC4. Ensure flexibility in movement configurations to accommodate varying production needs. | - | - | - | - |
| PC5. Implement and fine-tune collaborative features for safe human-robot interaction. | - | - | - | - |
| PC6. Verify that the COBOT can adapt its movements when working alongside human operators. | - | - | - | - |
| PC7. Demonstrate the ability to diagnose and identify issues in the COBOT's programming or hardware. | - | - | - | - |
| PC8. Utilize diagnostic tools effectively to pinpoint and resolve problems. | - | - | - | - |
| PC9. Conduct thorough root cause analysis for malfunctions, considering both software and hardware aspects. | - | - | - | - |
| PC10. Develop strategies to address recurring issues and prevent future occurrences. | - | - | - | - |
| PC11. Respond promptly to reported malfunctions and implement timely resolutions. | - | - | - | - |
| PC12. Minimize downtime by efficiently addressing programming or operational issues. | - | - | - | - |
| PC13. Analyze historical troubleshooting data to identify patterns and areas for improvement. | - | - | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| PC14. Propose and implement enhancements to prevent similar issues in the future | - | - | - | - |
| PC15. Develop and implement preventive maintenance programs for the COBOT's programming. | - | - | - | - |
| PC16. Schedule routine checks and updates to ensure optimal performance. | - | - | - | - |
| PC17. Incorporate error-proofing mechanisms in the programming to prevent common mistakes. | - | - | - | - |
| PC18. Implement safeguards to minimize the impact of operator errors on the robot's performance. | - | - | - | - |
| PC19. Ensure that the COBOT's movements comply with safety standards and regulations. | - | - | - | - |
| PC20. Implement safety features to prevent collisions and ensure safe collaboration with human workers. | - | - | - | - |
| NOS Total | 30 | 70 | - | - |

Qualification Pack

National Occupational Standards (NOS) Parameters

| | |
|----------------------------|--|
| NOS Code | CSC/N0520 |
| NOS Name | Configure robotic movements, troubleshoot and prevent malfunction |
| 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, Ship Building & Repair, Fire-Fighting & Safety Equipment, Homeland Security |
| Occupation | Service |
| NSQF Level | 5.5 |
| Credits | 3 |
| Version | 1.0 |
| Last Reviewed Date | 31/01/2024 |
| Next Review Date | 31/01/2027 |
| NSQC Clearance Date | 31/01/2024 |

Qualification Pack

CSC/N1339: Collaboratively coordinate with the team

Description

This OS unit is about building relationships and working with people and groups inside and outside the organization, using skills and habits, to achieve the team goals and objectives

Scope

The scope covers the following :

- This unit/task covers the following:
- 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

Elements and Performance Criteria

Communicate effectively at the workplace

To be competent, the user/individual on the job must be able to:

- PC1.** exchange information and instruction with colleagues, and seek clarifications and feedback
- PC2.** assist colleagues where required
- PC3.** follow business communication etiquette in all interactions and communicative formats (online, digital, and in-person)
- PC4.** document and share all relevant information with stakeholders in agreed formats and as per agreed timelines

Work effectively

To be competent, the user/individual on the job must be able to:

- PC5.** identify and obtain clarity regarding organisational, team and own goals and targets
- PC6.** prioritise and plan work in order to achieve goals and targets
- PC7.** monitor own and team performance as per agreed plan
- PC8.** complete duties accurately, systematically and within required timeframes
- PC9.** express emotions appropriately at the workplace and manage own response to heightened emotions
- PC10.** maintain orderliness and cleanliness in the work area Maintain and enhance professional competence
- PC11.** identify own strengths and weaknesses in relation to goals and targets
- PC12.** adapt self, service, or product to meet success criteria
- PC13.** seek and select opportunities for continuous professional development
- PC14.** formulate a professional development plan to enhance capabilities

Qualification Pack

- PC15.** build or contribute to the organizational knowledge base of cases, clients, issues, solutions, and innovations
- PC16.** examine developments and trends in field of work and their potential impact on work
- PC17.** take feedback from peers, supervisors and clients to improve own performance and practices

Work in a disciplined and ethical manner

To be competent, the user/individual on the job must be able to:

- PC18.** perform tasks as per workplace standards, organizational policies and legislative requirements
- PC19.** display appropriate professional appearance at the workplace and adhere to the organizational dress code
- PC20.** demonstrate responsible and disciplined behavior at the workplace such as punctuality; completing tasks as per given time and standards; demonstrating professional behavior at all times, adopting environment- friendly practices, etc.
- PC21.** identify the cause of conflict and options for resolution with peers or escalate grievances and problems to appropriate authority as per procedure for conflict resolution
- PC22.** protect the rights of the client and organization when delivering services
- PC23.** ensure services are delivered equally to all clients regardless of personal and cultural beliefs
- PC24.** operate within an agreed ethical code of practice and report unethical conduct to the appropriate authorities
- PC25.** follow organizational guidelines and legal requirements on disclosure and confidentiality

Uphold social diversity at the workplace

To be competent, the user/individual on the job must be able to:

- PC26.** recognize and evaluate biased practices against underrepresented groups like women and persons with disabilities, in workplace systems and processes
- PC27.** identify and report discrimination and harassment based on gender, disability, or cultural difference at the workplace
- PC28.** use inclusive or neutral language and gestures in all interactions
- PC29.** respect the personal and professional space of others
- PC30.** access grievance redressal mechanisms as per legislations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the organisation's policies and procedures for working with colleagues, roles and responsibilities
- KU2.** the importance of effective communication and establishing good working relationships with colleagues
- KU3.** different methods of communication and the circumstances in which it is appropriate to use these
- KU4.** the importance of creating an environment of trust and mutual respect
- KU5.** the implications of own work on the work and schedule of others
- KU6.** different types of information that colleagues might need and the importance of providing this information when it is required

Qualification Pack

KU7. the importance of helping colleagues with problems, to meet quality and time standards as a team

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** read and write instructions, guidelines, procedures, messages, emails, and other media in language of the workplace
- GS2.** communicate in common and technical terms in language of the workplace
- GS3.** listen effectively and orally communicate information
- GS4.** be punctual, do work scheduling and reporting
- GS5.** comply with workplace practices and ethics
- GS6.** maintain cleanliness and healthy environment
- GS7.** be customer friendly - understand real needs of the customer and suggest most appropriate solution
- GS8.** be safety conscious and avoid risk
- GS9.** be observant, vigilant, and security consciousness
- GS10.** respond, handle problem, and escalate as necessary
- GS11.** ask for clarification and advice from concerned persons
- GS12.** make decisions on a suitable course of action or response keeping in view resource utilization while meeting commitments
- GS13.** plan and organize work to achieve targets and deadlines

Qualification Pack

Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Communicate effectively at the workplace</i> | 7 | 20 | - | - |
| PC1. exchange information and instruction with colleagues, and seek clarifications and feedback | - | - | - | - |
| PC2. assist colleagues where required | - | - | - | - |
| PC3. follow business communication etiquette in all interactions and communicative formats (online, digital, and in-person) | - | - | - | - |
| PC4. document and share all relevant information with stakeholders in agreed formats and as per agreed timelines | - | - | - | - |
| <i>Work effectively</i> | 7 | 20 | - | - |
| PC5. identify and obtain clarity regarding organisational, team and own goals and targets | - | - | - | - |
| PC6. prioritise and plan work in order to achieve goals and targets | - | - | - | - |
| PC7. monitor own and team performance as per agreed plan | - | - | - | - |
| PC8. complete duties accurately, systematically and within required timeframes | - | - | - | - |
| PC9. express emotions appropriately at the workplace and manage own response to heightened emotions | - | - | - | - |
| PC10. maintain orderliness and cleanliness in the work area Maintain and enhance professional competence | - | - | - | - |
| PC11. identify own strengths and weaknesses in relation to goals and targets | - | - | - | - |
| PC12. adapt self, service, or product to meet success criteria | - | - | - | - |
| PC13. seek and select opportunities for continuous professional development | - | - | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| PC14. formulate a professional development plan to enhance capabilities | - | - | - | - |
| PC15. build or contribute to the organizational knowledge base of cases, clients, issues, solutions, and innovations | - | - | - | - |
| PC16. examine developments and trends in field of work and their potential impact on work | - | - | - | - |
| PC17. take feedback from peers, supervisors and clients to improve own performance and practices | - | - | - | - |
| <i>Work in a disciplined and ethical manner</i> | 8 | 20 | - | - |
| PC18. perform tasks as per workplace standards, organizational policies and legislative requirements | - | - | - | - |
| PC19. display appropriate professional appearance at the workplace and adhere to the organizational dress code | - | - | - | - |
| PC20. demonstrate responsible and disciplined behavior at the workplace such as punctuality; completing tasks as per given time and standards; demonstrating professional behavior at all times, adopting environment- friendly practices, etc. | - | - | - | - |
| PC21. identify the cause of conflict and options for resolution with peers or escalate grievances and problems to appropriate authority as per procedure for conflict resolution | - | - | - | - |
| PC22. protect the rights of the client and organization when delivering services | - | - | - | - |
| PC23. ensure services are delivered equally to all clients regardless of personal and cultural beliefs | - | - | - | - |
| PC24. operate within an agreed ethical code of practice and report unethical conduct to the appropriate authorities | - | - | - | - |
| PC25. follow organizational guidelines and legal requirements on disclosure and confidentiality | - | - | - | - |
| <i>Uphold social diversity at the workplace</i> | 8 | 10 | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| PC26. recognize and evaluate biased practices against underrepresented groups like women and persons with disabilities, in workplace systems and processes | - | - | - | - |
| PC27. identify and report discrimination and harassment based on gender, disability, or cultural difference at the workplace | - | - | - | - |
| PC28. use inclusive or neutral language and gestures in all interactions | - | - | - | - |
| PC29. respect the personal and professional space of others | - | - | - | - |
| PC30. access grievance redressal mechanisms as per legislations | - | - | - | - |
| NOS Total | 30 | 70 | - | - |

Qualification Pack

National Occupational Standards (NOS) Parameters

| | |
|----------------------------|--|
| NOS Code | CSC/N1339 |
| NOS Name | Collaboratively coordinate with the team |
| Sector | Capital Goods |
| Sub-Sector | Generic |
| Occupation | Generic |
| NSQF Level | 5 |
| Credits | 3 |
| Version | 1.0 |
| Last Reviewed Date | 31/01/2024 |
| Next Review Date | 31/01/2027 |
| NSQC Clearance Date | 31/01/2024 |

Qualification Pack

CSC/N0505: Follow health, safety and environment guidelines at workplace

Description

This OS unit is about following adequate safety procedures to make work environment healthy and safe

Scope

The scope covers the following :

- This unit/task covers the following:
- Adhere to standard safety procedures of the company
- Follow healthy practices and posture
- Practice waste management and recycling
- Conserve material and resources

Elements and Performance Criteria

Adhere to standard safety procedures of the organisation

To be competent, the user/individual on the job must be able to:

- PC1.** comply with general safety procedures and those for handling equipment, tools, chemicals, and hazardous material, as prescribed and followed in the organisation
- PC2.** remove finger rings or any other metal objects likely to interfere with the work
- PC3.** ensure that identification badge or any other object worn around the neck or on the clothing does not get caught in any rotating machine, or otherwise interfere with the work
- PC4.** use appropriate safety devices such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, helmets etc. recommended for the work being performed
- PC5.** inform, escalate, or raise alarm about any suspicions, unaccounted hazardous material, devices, or other objects found in the premises
- PC6.** inform, escalate, or raise alarm about any breach of safety or security procedure in the organisation
- PC7.** help achieve zero accidents goals at work
- PC8.** avoid damage to sensitive electronic components due to negligence of ESD procedures
- PC9.** participate regularly in fire drills or other safety related workshops organised by the organisation
- PC10.** follow strictly all access control and perimeter safety procedures in designated factory areas such as robotic work stations, automated production lines, automated material movement and other potentially risky operations
- PC11.** ensure that other people follow all access control and perimeter safety procedures in designated factory areas and help avoid accidents
- PC12.** use emergency switches or other mechanisms of stopping a machine immediately in case any emergency situation has developed or about to happen
- PC13.** ensure that electrical equipment are properly grounded
- PC14.** follow Cyber Security guidelines and be vigilant at workplace

Qualification Pack

PC15. proceed to designated safe assembly area immediately on hearing fire alarm

Follow healthy practices and posture

To be competent, the user/individual on the job must be able to:

PC16. wash hands and use sanitizers as recommended to prevent spread of diseases

PC17. follow common personal hygiene practices

PC18. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials

PC19. participate in company organised health sessions such as exercises, games, yoga, physiotherapy, and other activities

PC20. handle heavy and hazardous materials with care, while maintaining appropriate posture, using suitable tools, and handling equipment such as trolleys, jacks, and ladders

PC21. learn and apply first aid devices available in the workplace

PC22. learn and apply safety and handling procedures for electrical shock and electrocution

PC23. learn and apply emergency medical help services

PC24. follow workplace decorum and avoid emotional outbursts or inappropriate language

PC25. prevent any harassment at workplace

Practice waste management and recycling

To be competent, the user/individual on the job must be able to:

PC26. identify recyclable, non-recyclable, and hazardous waste generated in the workplace and comply with their disposal procedures

PC27. dispose non-recyclable waste and hazardous waste following recommended processes

PC28. deposit recyclable and reusable material at identified locations

PC29. support education and compliance of waste management processes

Conserve material and resources

To be competent, the user/individual on the job must be able to:

PC30. identify ways to optimize usage of material and resources such as water, electricity, energy in various tasks, activities, and processes

PC31. check for spills and leakages of material in various tasks, activities, and processes and plug them

PC32. escalate the leakage issue to appropriate authority if needed

PC33. carry out routine cleaning of tools, machines, and equipment and maintain them in good working condition to optimize efficiency and wastage

PC34. check if the equipment is functioning normally before commencing work and rectify or report any malfunctioning to the responsible agency

PC35. check for any odour, sparks, fumes, emission, unusual vibration, noise, or any other objectionable presence in the environment and take immediate corrective action followed by report to responsible agency

PC36. ensure electrical equipment are properly connected for use and are switched off when not in use

PC37. support education and compliance of resource conservation processes

Knowledge and Understanding (KU)

Qualification Pack

The individual on the job needs to know and understand:

- KU1.** company policies on workplace, environment, and personnel management
- KU2.** company policy on occupational safety and health
- KU3.** professional hazards related to nature of work and how to deal with them
- KU4.** how to maintain the work area safe and secure
- KU5.** how to handle hazardous materials, tools, and equipment
- KU6.** emergency procedures for fire, electrocution, physical injury, wounds, etc.
- KU7.** need for proper body posture and use of appropriate handling equipment
- KU8.** understand electrical grounding practices
- KU9.** common sources of pollution and ways to minimize it
- KU10.** waste management - categorisation, colour coding, handling, and disposal procedure
- KU11.** organisation policies and procedures for minimizing waste
- KU12.** efficient use of electricity, material, and water in processes
- KU13.** organization policies regarding network usage and security
- KU14.** norms for professional behaviour at workplace and dealing with deviations

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** communicating in the language of the workplace
- GS2.** reading and interpreting documents, drawings, symbols, and instructions
- GS3.** operating computer and common office equipment and diagnosing common electrical and interconnection problems
- GS4.** writing notes, reports, observations, emails
- GS5.** using personnel protective devices
- GS6.** maintaining clean and healthy work environment
- GS7.** using and operating safety devices and equipment
- GS8.** conducting work following workplace security processes and rules
- GS9.** responding to emergency situations pertaining to workplace
- GS10.** understanding people and collaborating to create a healthy workplace

Qualification Pack

Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| <i>Adhere to standard safety procedures of the organisation</i> | 7 | 10 | - | - |
| PC1. comply with general safety procedures and those for handling equipment, tools, chemicals, and hazardous material, as prescribed and followed in the organisation | - | - | - | - |
| PC2. remove finger rings or any other metal objects likely to interfere with the work | - | - | - | - |
| PC3. ensure that identification badge or any other object worn around the neck or on the clothing does not get caught in any rotating machine, or otherwise interfere with the work | - | - | - | - |
| PC4. use appropriate safety devices such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, helmets etc. recommended for the work being performed | - | - | - | - |
| PC5. inform, escalate, or raise alarm about any suspicions, unaccounted hazardous material, devices, or other objects found in the premises | - | - | - | - |
| PC6. inform, escalate, or raise alarm about any breach of safety or security procedure in the organisation | - | - | - | - |
| PC7. help achieve zero accidents goals at work | - | - | - | - |
| PC8. avoid damage to sensitive electronic components due to negligence of ESD procedures | - | - | - | - |
| PC9. participate regularly in fire drills or other safety related workshops organised by the organisation | - | - | - | - |
| PC10. follow strictly all access control and perimeter safety procedures in designated factory areas such as robotic work stations, automated production lines, automated material movement and other potentially risky operations | - | - | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| PC11. ensure that other people follow all access control and perimeter safety procedures in designated factory areas and help avoid accidents | - | - | - | - |
| PC12. use emergency switches or other mechanisms of stopping a machine immediately in case any emergency situation has developed or about to happen | - | - | - | - |
| PC13. ensure that electrical equipment are properly grounded | - | - | - | - |
| PC14. follow Cyber Security guidelines and be vigilant at workplace | - | - | - | - |
| PC15. proceed to designated safe assembly area immediately on hearing fire alarm | - | - | - | - |
| <i>Follow healthy practices and posture</i> | 8 | 10 | - | - |
| PC16. wash hands and use sanitizers as recommended to prevent spread of diseases | - | - | - | - |
| PC17. follow common personal hygiene practices | - | - | - | - |
| PC18. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials | - | - | - | - |
| PC19. participate in company organised health sessions such as exercises, games, yoga, physiotherapy, and other activities | - | - | - | - |
| PC20. handle heavy and hazardous materials with care, while maintaining appropriate posture, using suitable tools, and handling equipment such as trolleys, jacks, and ladders | - | - | - | - |
| PC21. learn and apply first aid devices available in the workplace | - | - | - | - |
| PC22. learn and apply safety and handling procedures for electrical shock and electrocution | - | - | - | - |
| PC23. learn and apply emergency medical help services | - | - | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| PC24. follow workplace decorum and avoid emotional outbursts or inappropriate language | - | - | - | - |
| PC25. prevent any harassment at workplace | - | - | - | - |
| <i>Practice waste management and recycling</i> | - | - | - | - |
| PC26. identify recyclable, non-recyclable, and hazardous waste generated in the workplace and comply with their disposal procedures | - | - | - | - |
| PC27. dispose non-recyclable waste and hazardous waste following recommended processes | - | - | - | - |
| PC28. deposit recyclable and reusable material at identified locations | - | - | - | - |
| PC29. support education and compliance of waste management processes | - | - | - | - |
| <i>Conserve material and resources</i> | - | - | - | - |
| PC30. identify ways to optimize usage of material and resources such as water, electricity, energy in various tasks, activities, and processes | - | - | - | - |
| PC31. check for spills and leakages of material in various tasks, activities, and processes and plug them | - | - | - | - |
| PC32. escalate the leakage issue to appropriate authority if needed | - | - | - | - |
| PC33. carry out routine cleaning of tools, machines, and equipment and maintain them in good working condition to optimize efficiency and wastage | - | - | - | - |
| PC34. check if the equipment is functioning normally before commencing work and rectify or report any malfunctioning to the responsible agency | - | - | - | - |
| PC35. check for any odour, sparks, fumes, emission, unusual vibration, noise, or any other objectionable presence in the environment and take immediate corrective action followed by report to responsible agency | - | - | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| PC36. ensure electrical equipment are properly connected for use and are switched off when not in use | - | - | - | - |
| PC37. support education and compliance of resource conservation processes | - | - | - | - |
| NOS Total | 15 | 20 | - | - |

Qualification Pack

National Occupational Standards (NOS) Parameters

| | |
|----------------------------|---|
| NOS Code | CSC/N0505 |
| NOS Name | Follow health, safety and environment guidelines at workplace |
| 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, Defence Equipment, Fire-Fighting & Safety Equipment, Homeland Security |
| Occupation | Service |
| NSQF Level | 5 |
| Credits | 1 |
| Version | 1.0 |
| Last Reviewed Date | 31/01/2024 |
| Next Review Date | 31/01/2027 |
| NSQC Clearance Date | 31/01/2024 |

Qualification Pack

DGT/VSQ/N0102: Employability Skills (60 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

To be competent, the user/individual on the job must be able to:

- PC1.** identify employability skills required for jobs in various industries
- PC2.** identify and explore learning and employability portals

Constitutional values - Citizenship

To be competent, the user/individual on the job must be able to:

- PC3.** recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.
- PC4.** follow environmentally sustainable practices

Becoming a Professional in the 21st Century

To be competent, the user/individual on the job must be able to:

- PC5.** recognize the significance of 21st Century Skills for employment
- PC6.** practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

Basic English Skills

To be competent, the user/individual on the job must be able to:

Qualification Pack

- PC7.** use basic English for everyday conversation in different contexts, in person and over the telephone
- PC8.** read and understand routine information, notes, instructions, mails, letters etc. written in English
- PC9.** write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

To be competent, the user/individual on the job must be able to:

- PC10.** understand the difference between job and career
- PC11.** prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

To be competent, the user/individual on the job must be able to:

- PC12.** follow verbal and non-verbal communication etiquette and active listening techniques in various settings
- PC13.** work collaboratively with others in a team

Diversity & Inclusion

To be competent, the user/individual on the job must be able to:

- PC14.** communicate and behave appropriately with all genders and PwD
- PC15.** escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

To be competent, the user/individual on the job must be able to:

- PC16.** select financial institutions, products and services as per requirement
- PC17.** carry out offline and online financial transactions, safely and securely
- PC18.** identify common components of salary and compute income, expenses, taxes, investments etc
- PC19.** identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

To be competent, the user/individual on the job must be able to:

- PC20.** operate digital devices and carry out basic internet operations securely and safely
- PC21.** use e- mail and social media platforms and virtual collaboration tools to work effectively
- PC22.** use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

To be competent, the user/individual on the job must be able to:

- PC23.** identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research
- PC24.** develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion
- PC25.** identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

To be competent, the user/individual on the job must be able to:

- PC26.** identify different types of customers
- PC27.** identify and respond to customer requests and needs in a professional manner.

Qualification Pack

PC28. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

To be competent, the user/individual on the job must be able to:

PC29. create a professional Curriculum vitae (Résumé)

PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

PC31. apply to identified job openings using offline /online methods as per requirement

PC32. answer questions politely, with clarity and confidence, during recruitment and selection

PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills and different learning and employability related portals

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

KU6. importance of career development and setting long- and short-term goals

KU7. about effective communication

KU8. POSH Act

KU9. Gender sensitivity and inclusivity

KU10. different types of financial institutes, products, and services

KU11. how to compute income and expenditure

KU12. importance of maintaining safety and security in offline and online financial transactions

KU13. different legal rights and laws

KU14. different types of digital devices and the procedure to operate them safely and securely

KU15. how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

KU16. how to identify business opportunities

KU17. types and needs of customers

KU18. how to apply for a job and prepare for an interview

KU19. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read and write different types of documents/instructions/correspondence

GS2. communicate effectively using appropriate language in formal and informal settings



Qualification Pack

- GS3.** behave politely and appropriately with all
- GS4.** how to work in a virtual mode
- GS5.** perform calculations efficiently
- GS6.** solve problems effectively
- GS7.** pay attention to details
- GS8.** manage time efficiently
- GS9.** maintain hygiene and sanitization to avoid infection

Qualification Pack

Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Introduction to Employability Skills</i> | 1 | 1 | - | - |
| PC1. identify employability skills required for jobs in various industries | - | - | - | - |
| PC2. identify and explore learning and employability portals | - | - | - | - |
| <i>Constitutional values - Citizenship</i> | 1 | 1 | - | - |
| PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc. | - | - | - | - |
| PC4. follow environmentally sustainable practices | - | - | - | - |
| <i>Becoming a Professional in the 21st Century</i> | 2 | 4 | - | - |
| PC5. recognize the significance of 21st Century Skills for employment | - | - | - | - |
| PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life | - | - | - | - |
| <i>Basic English Skills</i> | 2 | 3 | - | - |
| PC7. use basic English for everyday conversation in different contexts, in person and over the telephone | - | - | - | - |
| PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English | - | - | - | - |
| PC9. write short messages, notes, letters, e-mails etc. in English | - | - | - | - |
| <i>Career Development & Goal Setting</i> | 1 | 2 | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| PC10. understand the difference between job and career | - | - | - | - |
| PC11. prepare a career development plan with short- and long-term goals, based on aptitude | - | - | - | - |
| <i>Communication Skills</i> | 2 | 2 | - | - |
| PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings | - | - | - | - |
| PC13. work collaboratively with others in a team | - | - | - | - |
| <i>Diversity & Inclusion</i> | 1 | 2 | - | - |
| PC14. communicate and behave appropriately with all genders and PwD | - | - | - | - |
| PC15. escalate any issues related to sexual harassment at workplace according to POSH Act | - | - | - | - |
| <i>Financial and Legal Literacy</i> | 2 | 3 | - | - |
| PC16. select financial institutions, products and services as per requirement | - | - | - | - |
| PC17. carry out offline and online financial transactions, safely and securely | - | - | - | - |
| PC18. identify common components of salary and compute income, expenses, taxes, investments etc | - | - | - | - |
| PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation | - | - | - | - |
| <i>Essential Digital Skills</i> | 3 | 4 | - | - |
| PC20. operate digital devices and carry out basic internet operations securely and safely | - | - | - | - |
| PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively | - | - | - | - |
| PC22. use basic features of word processor, spreadsheets, and presentations | - | - | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Entrepreneurship</i> | 2 | 3 | - | - |
| PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research | - | - | - | - |
| PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion | - | - | - | - |
| PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity | - | - | - | - |
| <i>Customer Service</i> | 1 | 2 | - | - |
| PC26. identify different types of customers | - | - | - | - |
| PC27. identify and respond to customer requests and needs in a professional manner. | - | - | - | - |
| PC28. follow appropriate hygiene and grooming standards | - | - | - | - |
| <i>Getting ready for apprenticeship & Jobs</i> | 2 | 3 | - | - |
| PC29. create a professional Curriculum vitae (Résumé) | - | - | - | - |
| PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively | - | - | - | - |
| PC31. apply to identified job openings using offline /online methods as per requirement | - | - | - | - |
| PC32. answer questions politely, with clarity and confidence, during recruitment and selection | - | - | - | - |
| PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements | - | - | - | - |
| NOS Total | 20 | 30 | - | - |

Qualification Pack

National Occupational Standards (NOS) Parameters

| | |
|----------------------------|---------------------------------|
| NOS Code | DGT/VSQ/N0102 |
| NOS Name | Employability Skills (60 Hours) |
| Sector | Cross Sectoral |
| Sub-Sector | Professional Skills |
| Occupation | Employability |
| NSQF Level | 4 |
| Credits | 2 |
| Version | 1.0 |
| Last Reviewed Date | 30/11/2023 |
| Next Review Date | 29/11/2026 |
| NSQC Clearance Date | 30/11/2023 |

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down the proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on the knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for the theory part for each candidate at each examination/training centre (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training centre based on these criteria.
6. To pass the Qualification Pack assessment, every trainee should score a minimum of 70% of % aggregate marks to successfully clear the assessment.

Qualification Pack

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(Please note: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

| National Occupational Standards | Theory Marks | Practical Marks | Project Marks | Viva Marks | Total Marks | Weightage |
|---|--------------|-----------------|---------------|------------|-------------|------------|
| CSC/N0521.Assist in designing, Programming, and maintaining industrial robotic systems. | 30 | 70 | - | - | 100 | 25 |
| CSC/N0513.Perform Installation, commissioning, and integration of robotic systems | 40 | 60 | - | - | 100 | 15 |
| CSC/N0514.Carry out Robot Operating Systems (ROS) programming of Robots and COBOTS | 40 | 60 | - | - | 100 | 15 |
| CSC/N0520.Configure robotic movements, troubleshoot and prevent malfunction | 30 | 70 | - | - | 100 | 15 |
| CSC/N1339.Collaboratively coordinate with the team | 30 | 70 | - | - | 100 | 10 |
| CSC/N0505.Follow health, safety and environment guidelines at workplace | 15 | 20 | - | - | 35 | 10 |
| DGT/VSQ/N0102.Employability Skills (60 Hours) | 20 | 30 | - | - | 50 | 10 |
| Total | 205 | 380 | - | - | 585 | 100 |



Qualification Pack

Acronyms

| | |
|-------------|---|
| NOS | National Occupational Standard(s) |
| NSQF | National Skills Qualifications Framework |
| QP | Qualifications Pack |
| TVET | Technical and Vocational Education and Training |

Qualification Pack

Glossary

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|--|--|
| Sector | Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests. |
| Sub-sector | Sub-sector is derived from a further breakdown based on the characteristics and interests of its components. |
| Occupation | Occupation is a set of job roles, which perform similar/ related set of functions in an industry. |
| Job role | Job role defines a unique set of functions that together form a unique employment opportunity in an organisation. |
| Occupational Standards (OS) | OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts. |
| Performance Criteria (PC) | Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task. |
| National Occupational Standards (NOS) | NOS are occupational standards which apply uniquely in the Indian context. |
| Qualifications Pack (QP) | QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code. |
| Unit Code | Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N' |
| Unit Title | Unit title gives a clear overall statement about what the incumbent should be able to do. |
| Description | Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for. |
| Scope | Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required. |

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|---|---|
| Knowledge and Understanding (KU) | <p>Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.</p> |
| Organisational Context | <p>Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.</p> |
| Technical Knowledge | <p>Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.</p> |
| Core Skills/ Generic Skills (GS) | <p>Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.</p> |
| Electives | <p>Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.</p> |
| Options | <p>Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.</p> |