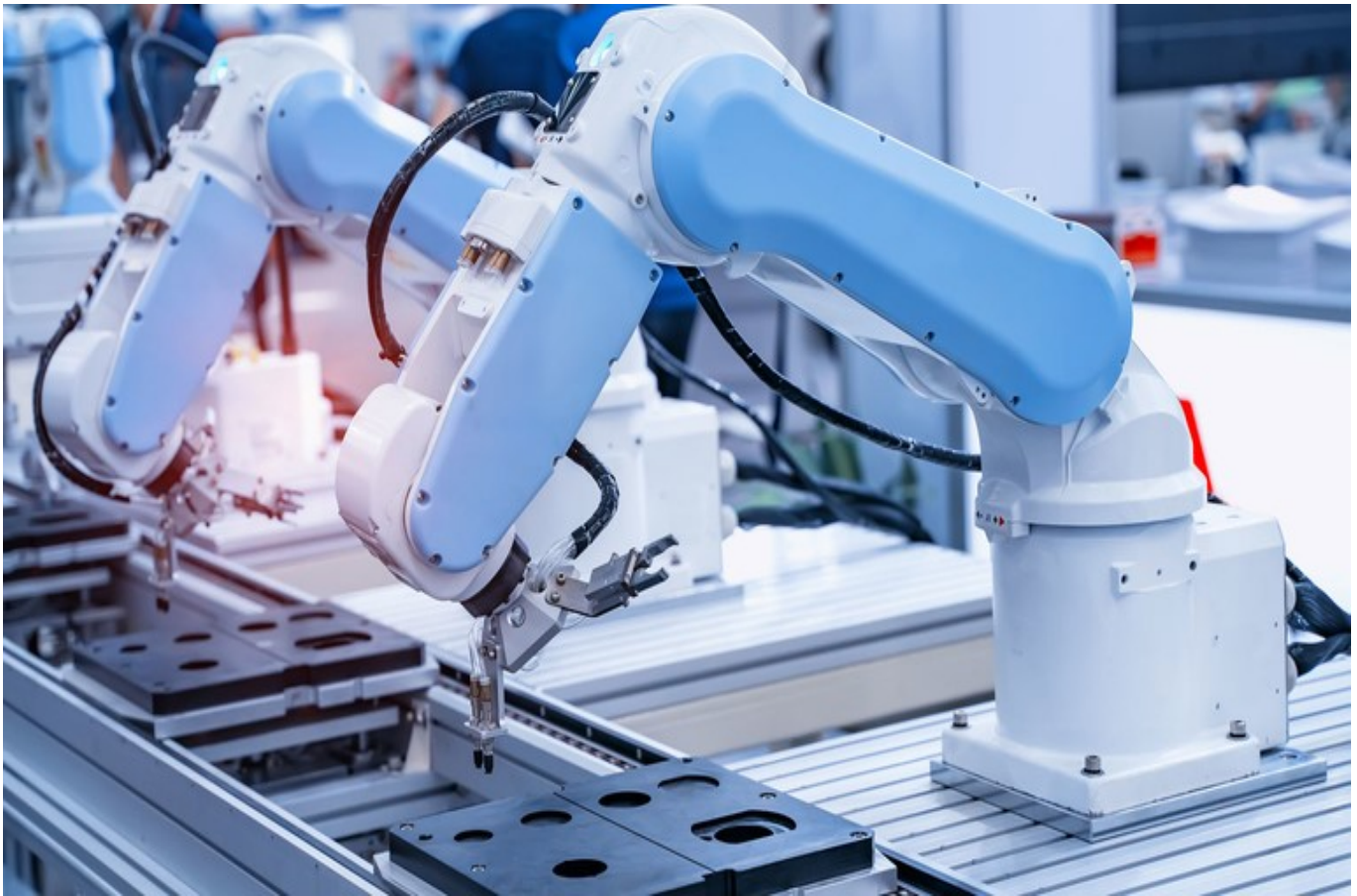


## Qualification Pack



# Robotics Automation Lead

QP Code: ELE/Q7106

Version: 2.0

NSQF Level: 7

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## Qualification Pack

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## Qualification Pack

### ELE/Q7106: Robotics Automation Lead

#### Brief Job Description

A Robotics Automation Lead designs and monitors all the computer-controlled systems and robotic devices used within industrial and commercial facilities to reduce human intervention and maximise efficiency. The individual assists manufacturing, mechanical, and electronics engineers in all phases of process design, development, production, testing, installation of the robot and operations.

#### Personal Attributes

The individual must have attention to detail, problem-solving skills and the ability to work in coordination with others. The person must also have managerial skills to manage and lead a team of engineers.

#### Applicable National Occupational Standards (NOS)

##### Compulsory NOS:

1. [ELE/N7117: Use the appropriate Robotic Process Automation \(RPA\) software](#)
2. [ELE/N7118: Integrate robot manipulators with process components](#)
3. [ELE/N7119: Perform source control integration in the RPA software](#)
4. [ELE/N7120: Use REFramework in the RPA software](#)
5. [ELE/N7121: Use the robot sensing and machine vision technologies](#)
6. [ELE/N1002: Apply health and safety practices at the workplace](#)
7. [DGT/VSQ/N0103: Employability Skills \(90 Hours\)](#)

#### Qualification Pack (QP) Parameters

|            |                 |
|------------|-----------------|
| Sector     | Electronics     |
| Sub-Sector |                 |
| Occupation | Engineering-I&A |
| Country    | India           |
| NSQF Level | 7               |

## Qualification Pack

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Credits</b>                                            | 27                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Aligned to NCO/ISCO/ISIC Code</b>                      | NCO-2015/7412.0101                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Minimum Educational Qualification &amp; Experience</b> | <p>Completed 4 year UG program (Electronics/Mechanical/Electrical/Computer science) with 2 Years of experience Relevant Experience</p> <p>OR</p> <p>B.Sc (Mechatronics) with 3 Years of experience Relevant Experience</p> <p>OR</p> <p>Previous relevant Qualification of NSQF Level (6) with 3 Years of experience Relevant Experience</p> <p>OR</p> <p>Pursuing PhD with NA of experience</p> |
| <b>Minimum Level of Education for Training in School</b>  | Not Applicable                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Pre-Requisite License or Training</b>                  | NA                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Minimum Job Entry Age</b>                              | 21 Years                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Last Reviewed On</b>                                   | NA                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Next Review Date</b>                                   | 30/04/2025                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>NSQC Approval Date</b>                                 | 24/02/2022                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Version</b>                                            | 2.0                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Reference code on NQR</b>                              | QG-07-EH-01337-2023-V1.1-ESSC                                                                                                                                                                                                                                                                                                                                                                    |
| <b>NQR Version</b>                                        | 1.1                                                                                                                                                                                                                                                                                                                                                                                              |

## Qualification Pack

### ELE/N7117: Use the appropriate Robotic Process Automation (RPA) software

#### Description

This OS unit is about implementing RPA, setting up the RPA software for use and dealing with cybersecurity attacks in robotics.

#### Scope

The scope covers the following :

- Implement RPA
- Set up the RPA software for use
- Deal with cybersecurity attacks in robotics

#### Elements and Performance Criteria

##### *Implement RPA*

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

- PC1.** determine how RPA can handle the front end of the system
- PC2.** integrate RPA with the existing systems
- PC3.** use RPA to improve the efficiency of digitizing, auditing and processing data
- PC4.** determine how RPA bots will work at the level of the UI and interact with the relevant systems
- PC5.** automate the repetitive tasks and manual processes using RPA
- PC6.** improve the accuracy of data and its processing speed with a reduction in manual errors using the relevant RPA technique
- PC7.** select the appropriate robotics process automation tool according to the size of the client organisation
- PC8.** set up software libraries and tools to build robot applications using the ROS system

##### *Set up the RPA software for use*

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

- PC9.** use the RPA software to design automation processes
- PC10.** view all available project templates, search and filter them by source and create a new project based on a template
- PC11.** apply necessary changes to the template to provides quick access to variables, arguments and imports
- PC12.** build automation by managing the activities added to the workflow file
- PC13.** debug workflow using debugging tools to set breakpoints
- PC14.** monitor the execution of debugging activities step by step and adjust the debugging speed

##### *Deal with cybersecurity attacks in robotics*

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

- PC15.** identify the field of possible cybersecurity attacks in robotics programming

## Qualification Pack

**PC16.** select the appropriate control system

**PC17.** determine different types of threats and vulnerabilities in the cloud

**PC18.** set up the authentication process to access the robotics program

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

**KU1.** the importance and use of debugging tools in RPA

**KU2.** the benefits and applications of RPA

**KU3.** the difference between RPA and traditional automation

**KU4.** different types of bots

**KU5.** RPA development methodology and key considerations

**KU6.** use of various RPA tools

**KU7.** different types of RPA software and its components

**KU8.** how to install an RPA software

**KU9.** different workflow files in the RPA software

**KU10.** the concept of control system and its process

**KU11.** the concept of control system and its process

**KU12.** the authentication process for accessing the robotics program

**KU13.** intelligent autonomous robots

**KU14.** how to mitigate cybersecurity attacks on robotic systems

**KU15.** the importance and need of robotics in the automation process

**KU16.** use of artificial intelligence, screen scraping, and workflow automation in the RPA process

**KU17.** how the combination of RPA solutions are used with intelligent technologies in different industries

**KU18.** functioning of intelligent agents and autonomous robots

**KU19.** the process of integrating RPA with existing systems

**KU20.** the process of digitizing, auditing and processing data using RPA

**KU21.** how to identify cybersecurity attacks in robotics programming

## Generic Skills (GS)

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

**GS1.** write work-related notes

**GS2.** read the relevant guides, manuals and literature to get the latest information about the field of work

**GS3.** communicate politely and professionally

**GS4.** listen attentively to understand the instructions being given

**GS5.** identify solutions to work-related issues

**GS6.** plan and prioritise tasks to ensure timely completion



## Qualification Pack

**GS7.** take quick decisions to deal with any emergencies or accidents

**GS8.** coordinate with the co-workers to achieve the work objectives

## Qualification Pack

### Assessment Criteria

| Assessment Criteria for Outcomes                                                                                                     | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <i>Implement RPA</i>                                                                                                                 | <b>10</b>    | <b>15</b>       | -             | <b>4</b>   |
| <b>PC1.</b> determine how RPA can handle the front end of the system                                                                 | -            | -               | -             | -          |
| <b>PC2.</b> integrate RPA with the existing systems                                                                                  | -            | -               | -             | -          |
| <b>PC3.</b> use RPA to improve the efficiency of digitizing, auditing and processing data                                            | -            | -               | -             | -          |
| <b>PC4.</b> determine how RPA bots will work at the level of the UI and interact with the relevant systems                           | -            | -               | -             | -          |
| <b>PC5.</b> automate the repetitive tasks and manual processes using RPA                                                             | -            | -               | -             | -          |
| <b>PC6.</b> improve the accuracy of data and its processing speed with a reduction in manual errors using the relevant RPA technique | -            | -               | -             | -          |
| <b>PC7.</b> select the appropriate robotics process automation tool according to the size of the client organisation                 | -            | -               | -             | -          |
| <b>PC8.</b> set up software libraries and tools to build robot applications using the ROS system                                     | -            | -               | -             | -          |
| <i>Set up the RPA software for use</i>                                                                                               | <b>10</b>    | <b>25</b>       | -             | <b>7</b>   |
| <b>PC9.</b> use the RPA software to design automation processes                                                                      | -            | -               | -             | -          |
| <b>PC10.</b> view all available project templates, search and filter them by source and create a new project based on a template     | -            | -               | -             | -          |
| <b>PC11.</b> apply necessary changes to the template to provides quick access to variables, arguments and imports                    | -            | -               | -             | -          |
| <b>PC12.</b> build automation by managing the activities added to the workflow file                                                  | -            | -               | -             | -          |



## Qualification Pack

| Assessment Criteria for Outcomes                                                                       | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>PC13.</b> debug workflow using debugging tools to set breakpoints                                   | -            | -               | -             | -          |
| <b>PC14.</b> monitor the execution of debugging activities step by step and adjust the debugging speed | -            | -               | -             | -          |
| <i>Deal with cybersecurity attacks in robotics</i>                                                     | <b>10</b>    | <b>15</b>       | -             | <b>4</b>   |
| <b>PC15.</b> identify the field of possible cybersecurity attacks in robotics programming              | -            | -               | -             | -          |
| <b>PC16.</b> select the appropriate control system                                                     | -            | -               | -             | -          |
| <b>PC17.</b> determine different types of threats and vulnerabilities in the cloud                     | -            | -               | -             | -          |
| <b>PC18.</b> set up the authentication process to access the robotics program                          | -            | -               | -             | -          |
| <b>NOS Total</b>                                                                                       | <b>30</b>    | <b>55</b>       | -             | <b>15</b>  |



## Qualification Pack

### National Occupational Standards (NOS) Parameters

|                            |                                                               |
|----------------------------|---------------------------------------------------------------|
| <b>NOS Code</b>            | ELE/N7117                                                     |
| <b>NOS Name</b>            | Use the appropriate Robotic Process Automation (RPA) software |
| <b>Sector</b>              | Electronics                                                   |
| <b>Sub-Sector</b>          | Industrial Automation                                         |
| <b>Occupation</b>          | Engineering-I&A                                               |
| <b>NSQF Level</b>          | 7                                                             |
| <b>Credits</b>             | TBD                                                           |
| <b>Version</b>             | 1.0                                                           |
| <b>Last Reviewed Date</b>  | 24/02/2022                                                    |
| <b>Next Review Date</b>    | 24/02/2025                                                    |
| <b>NSQC Clearance Date</b> | 24/02/2022                                                    |

## Qualification Pack

### ELE/N7118: Integrate robot manipulators with process components

#### Description

This OS unit is about integrating robot manipulators with process components.

#### Scope

The scope covers the following :

- Set up process components
- Integrate robot manipulators

#### Elements and Performance Criteria

##### *Set up process components*

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

- PC1.** use the RPA software to create standalone automation projects such as a process or library
- PC2.** configure a set of changes at the project level and apply them to all the activities of project dependencies
- PC3.** use the relevant variables in the User Interface (UI) to enable the functionality of the panel
- PC4.** use the relevant argument in automation with an Invoke Workflow File activity
- PC5.** create arguments and make changes to them in the Arguments panel
- PC6.** use the renaming feature in an argument in the panel to automatically updates all occurrences in the current file
- PC7.** integrate the technology behind the application to identify elements, trigger events and get data behind the scenes
- PC8.** check all the imported namespaces are displayed correctly in the import panel
- PC9.** formulate the various user events related activities found in the RPA

##### *Integrate robot manipulators*

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

- PC10.** modify the variation of gravity torque and inertia with robot configuration
- PC11.** examine the multi-finger grasping, walking mechanisms, motion planning in robotics
- PC12.** evaluate the application of the robotics system
- PC13.** integrate all the data collected by robot for map building
- PC14.** inspect how the geometric robot model describes the orientation of a coordinate frame attached to the gripper
- PC15.** measure the angles of rotation and the distances of the displacements of translational joints using a robot manipulator
- PC16.** estimate the shortest path between a moving part and an obstacle at the given location and use an appropriate approach to detect whether two objects intervene
- PC17.** use rigid manipulators and specialised grippers for object manipulation and grasping

#### Knowledge and Understanding (KU)

## Qualification Pack

The individual on the job needs to know and understand:

- KU1.** the User Interface (UI) automation process
- KU2.** applicable system activities and variables
- KU3.** how to import panel data
- KU4.** the application of robotics system in the automation industry
- KU5.** the working of forward and inverse kinematics
- KU6.** the function of manipulators
- KU7.** how to control flexible joint robotic systems, feedback, force control, and stability, and drive train dynamics
- KU8.** multi-finger grasping, walking mechanisms, motion planning
- KU9.** optimisation in robotic systems and industrial applications
- KU10.** the process of geometrical modelling and map building
- KU11.** the process of path planning and avoiding obstacles in robotics by frequently detecting whether two objects will intervene
- KU12.** the process of object manipulation and grasping
- KU13.** how to create standalone automation projects
- KU14.** different types of variables used in UI
- KU15.** how to use an argument in automation with an invoke workflow file activity
- KU16.** the process of creating arguments and making changes to them in the arguments panel
- KU17.** how to rename an argument in panel
- KU18.** user events related activities found in the RPA software
- KU19.** joint torque and recursive Newton-Euler formulation
- KU20.** gravity torque and inertia with robot configuration multi-finger grasping, walking mechanisms, motion planning in robotics
- KU21.** how to integrate all the data collected by robot for map building
- KU22.** how a robot manipulator measures the angles of rotation and the distances
- KU23.** how to estimate the shortest path between a moving part and an obstacle at the given location
- KU24.** use of rigid manipulators and specialised grippers for object manipulation and grasping

## Generic Skills (GS)

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

- GS1.** maintain work-related notes and records
- GS2.** read the relevant guides and literature to get the latest information about the field of work
- GS3.** communicate clearly and politely
- GS4.** perform basic calculations
- GS5.** listen attentively to understand the instructions being given
- GS6.** identify solutions to work-related issues
- GS7.** plan and prioritise tasks to ensure timely completion



## Qualification Pack

**GS8.** take quick decision in case of an emergency/ accident

## Qualification Pack

### Assessment Criteria

| Assessment Criteria for Outcomes                                                                                                | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <i>Set up process components</i>                                                                                                | <b>15</b>    | <b>34</b>       | -             | <b>8</b>   |
| <b>PC1.</b> use the RPA software to create standalone automation projects such as a process or library                          | -            | -               | -             | -          |
| <b>PC2.</b> configure a set of changes at the project level and apply them to all the activities of project dependencies        | -            | -               | -             | -          |
| <b>PC3.</b> use the relevant variables in the User Interface (UI) to enable the functionality of the panel                      | -            | -               | -             | -          |
| <b>PC4.</b> use the relevant argument in automation with an Invoke Workflow File activity                                       | -            | -               | -             | -          |
| <b>PC5.</b> create arguments and make changes to them in the Arguments panel                                                    | -            | -               | -             | -          |
| <b>PC6.</b> use the renaming feature in an argument in the panel to automatically updates all occurrences in the current file   | -            | -               | -             | -          |
| <b>PC7.</b> integrate the technology behind the application to identify elements, trigger events and get data behind the scenes | -            | -               | -             | -          |
| <b>PC8.</b> check all the imported namespaces are displayed correctly in the import panel                                       | -            | -               | -             | -          |
| <b>PC9.</b> formulate the various user events related activities found in the RPA                                               | -            | -               | -             | -          |
| <i>Integrate robot manipulators</i>                                                                                             | <b>15</b>    | <b>21</b>       | -             | <b>7</b>   |
| <b>PC10.</b> modify the variation of gravity torque and inertia with robot configuration                                        | -            | -               | -             | -          |
| <b>PC11.</b> examine the multi-finger grasping, walking mechanisms, motion planning in robotics                                 | -            | -               | -             | -          |
| <b>PC12.</b> evaluate the application of the robotics system                                                                    | -            | -               | -             | -          |

## Qualification Pack

| Assessment Criteria for Outcomes                                                                                                                                            | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>PC13.</b> integrate all the data collected by robot for map building                                                                                                     | -            | -               | -             | -          |
| <b>PC14.</b> inspect how the geometric robot model describes the orientation of a coordinate frame attached to the gripper                                                  | -            | -               | -             | -          |
| <b>PC15.</b> measure the angles of rotation and the distances of the displacements of translational joints using a robot manipulator                                        | -            | -               | -             | -          |
| <b>PC16.</b> estimate the shortest path between a moving part and an obstacle at the given location and use an appropriate approach to detect whether two objects intervene | -            | -               | -             | -          |
| <b>PC17.</b> use rigid manipulators and specialised grippers for object manipulation and grasping                                                                           | -            | -               | -             | -          |
| <b>NOS Total</b>                                                                                                                                                            | <b>30</b>    | <b>55</b>       | <b>-</b>      | <b>15</b>  |

## Qualification Pack

### National Occupational Standards (NOS) Parameters

|                            |                                                      |
|----------------------------|------------------------------------------------------|
| <b>NOS Code</b>            | ELE/N7118                                            |
| <b>NOS Name</b>            | Integrate robot manipulators with process components |
| <b>Sector</b>              | Electronics                                          |
| <b>Sub-Sector</b>          | Industrial Automation                                |
| <b>Occupation</b>          | Engineering-I&A                                      |
| <b>NSQF Level</b>          | 7                                                    |
| <b>Credits</b>             | TBD                                                  |
| <b>Version</b>             | 1.0                                                  |
| <b>Last Reviewed Date</b>  | 24/02/2022                                           |
| <b>Next Review Date</b>    | 24/02/2025                                           |
| <b>NSQC Clearance Date</b> | 24/02/2022                                           |



## Qualification Pack

### ELE/N7119: Perform source control integration in the RPA software

#### Description

This OS unit is about performing source control integration in the RPA software which includes app integration, recording and scraping. It also covers data manipulation, PDF automation, programming, debugging and logging.

#### Scope

The scope covers the following :

- Carry out app integration, recording and scraping
- Carry out data manipulation and PDF automation
- Carry out programming, debugging and logging

#### Elements and Performance Criteria

##### *Carry out app Integration, recording and scraping*

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

- PC1.** integrate all the data in the RPA software
- PC2.** use the recording function to detect the fault in jobs
- PC3.** determine the robotic failure and extract text from it using screen scraping wizard
- PC4.** extract data from specific UI elements or documents such as a PDF file
- PC5.** automate the relevant actions in the user interface
- PC6.** use various windows, buttons and drop-down lists as per the requirement
- PC7.** store the attributes of a graphical user interface element and its parents in the shape of an XML fragment

##### *Carry out data manipulation and PDF automation*

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

- PC8.** automate the appropriate sequence to extract information from an input text and output it in a different format
- PC9.** read the text from a Word file, write it into another document, add a picture, and convert it from Word to PDF by using Word Application Scope in the RPA software
- PC10.** summarise the collected data and program it in the robotics software
- PC11.** emulate different computers with different OSs on a single computer or create a virtual lab with several differently configured virtual machines
- PC12.** use the relevant Virtual Machine (VM) software to connect virtually and remotely to the client's applications and networks
- PC13.** enable image and text-based process automation such as keyboard and mouse input simulation in the RPA software

##### *Carry out programming, debugging and logging*

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

- PC14.** select an appropriate integrated development environment for programming

## Qualification Pack

- PC15.** select the appropriate error handling method in the RPA software
- PC16.** examine the logging method and enable the correct extension method to be used in the RPA software
- PC17.** select the appropriate self-testing method for checking errors in the RPA software
- PC18.** analyse information about all the Robots on an aggregate basis, and check the overall health of the Robots in the system
- PC19.** use the self-diagnosing tool appropriately as per the standard procedure
- PC20.** ensure the separation of Orchestrator components within tenants for assigned users

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the process of app integration
- KU2.** the process of data manipulation
- KU3.** the process of automating virtual machines
- KU4.** the process of text, image and PDF automation in RPA
- KU5.** the basics of programming
- KU6.** the process of auto-health checking
- KU7.** the power-on self-diagnosing
- KU8.** project organisation process
- KU9.** how to integrate data in RPA
- KU10.** the functions of recording in RPA
- KU11.** how to extract data from a specific UI element or document
- KU12.** how to automate specific actions in the user interface
- KU13.** the process of storing the attributes of a graphical user interface element
- KU14.** how to automate a sequence and summarise the collected data
- KU15.** how to manipulate data in robotics software
- KU16.** the process of using a VM software to connect virtually and remotely to the client's applications and networks
- KU17.** how to enable image and text-based process automation
- KU18.** the process of using computers to gain high-level understanding from digital images or videos
- KU19.** the importance of ensuring an integrated development environment for developers
- KU20.** the process of debugging and its functionality in various projects
- KU21.** different methods of error handling in the RPA software
- KU22.** how self-testing takes place and the steps involved in error checking
- KU23.** the process of separation of Orchestrator components within tenants for assigned users
- KU24.** how the workflow activity of the RPA path runs in the system
- KU25.** how a modular server product provides a rich set of PDF processing functions for different environments



## Qualification Pack

### Generic Skills (GS)

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

- GS1.** maintain work-related documents
- GS2.** read the relevant guides, manuals and literature to get the latest information about the field of work
- GS3.** communicate politely and professionally
- GS4.** listen attentively to understand the instructions being given
- GS5.** identify solutions to work-related issues
- GS6.** plan and prioritise tasks to ensure timely completion
- GS7.** take quick decisions to deal with any emergencies or accidents
- GS8.** coordinate with the co-workers to achieve the work objectives

## Qualification Pack

### Assessment Criteria

| Assessment Criteria for Outcomes                                                                                                                                               | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <i>Carry out app Integration, recording and scraping</i>                                                                                                                       | <b>10</b>    | <b>15</b>       | -             | <b>4</b>   |
| <b>PC1.</b> integrate all the data in the RPA software                                                                                                                         | -            | -               | -             | -          |
| <b>PC2.</b> use the recording function to detect the fault in jobs                                                                                                             | -            | -               | -             | -          |
| <b>PC3.</b> determine the robotic failure and extract text from it using screen scraping wizard                                                                                | -            | -               | -             | -          |
| <b>PC4.</b> extract data from specific UI elements or documents such as a PDF file                                                                                             | -            | -               | -             | -          |
| <b>PC5.</b> automate the relevant actions in the user interface                                                                                                                | -            | -               | -             | -          |
| <b>PC6.</b> use various windows, buttons and drop-down lists as per the requirement                                                                                            | -            | -               | -             | -          |
| <b>PC7.</b> store the attributes of a graphical user interface element and its parents in the shape of an XML fragment                                                         | -            | -               | -             | -          |
| <i>Carry out data manipulation and PDF automation</i>                                                                                                                          | <b>10</b>    | <b>25</b>       | -             | <b>7</b>   |
| <b>PC8.</b> automate the appropriate sequence to extract information from an input text and output it in a different format                                                    | -            | -               | -             | -          |
| <b>PC9.</b> read the text from a Word file, write it into another document, add a picture, and convert it from Word to PDF by using Word Application Scope in the RPA software | -            | -               | -             | -          |
| <b>PC10.</b> summarise the collected data and program it in the robotics software                                                                                              | -            | -               | -             | -          |
| <b>PC11.</b> emulate different computers with different OSs on a single computer or create a virtual lab with several differently configured virtual machines                  | -            | -               | -             | -          |
| <b>PC12.</b> use the relevant Virtual Machine (VM) software to connect virtually and remotely to the client's applications and networks                                        | -            | -               | -             | -          |

## Qualification Pack

| Assessment Criteria for Outcomes                                                                                                      | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>PC13.</b> enable image and text-based process automation such as keyboard and mouse input simulation in the RPA software           | -            | -               | -             | -          |
| <i>Carry out programming, debugging and logging</i>                                                                                   | <b>10</b>    | <b>15</b>       | -             | <b>4</b>   |
| <b>PC14.</b> select an appropriate integrated development environment for programming                                                 | -            | -               | -             | -          |
| <b>PC15.</b> select the appropriate error handling method in the RPA software                                                         | -            | -               | -             | -          |
| <b>PC16.</b> examine the logging method and enable the correct extension method to be used in the RPA software                        | -            | -               | -             | -          |
| <b>PC17.</b> select the appropriate self-testing method for checking errors in the RPA software                                       | -            | -               | -             | -          |
| <b>PC18.</b> analyse information about all the Robots on an aggregate basis, and check the overall health of the Robots in the system | -            | -               | -             | -          |
| <b>PC19.</b> use the self-diagnosing tool appropriately as per the standard procedure                                                 | -            | -               | -             | -          |
| <b>PC20.</b> ensure the separation of Orchestrator components within tenants for assigned users                                       | -            | -               | -             | -          |
| <b>NOS Total</b>                                                                                                                      | <b>30</b>    | <b>55</b>       | -             | <b>15</b>  |

## Qualification Pack

### National Occupational Standards (NOS) Parameters

|                            |                                                        |
|----------------------------|--------------------------------------------------------|
| <b>NOS Code</b>            | ELE/N7119                                              |
| <b>NOS Name</b>            | Perform source control integration in the RPA software |
| <b>Sector</b>              | Electronics                                            |
| <b>Sub-Sector</b>          | Industrial Automation                                  |
| <b>Occupation</b>          | Engineering-I&A                                        |
| <b>NSQF Level</b>          | 7                                                      |
| <b>Credits</b>             | TBD                                                    |
| <b>Version</b>             | 1.0                                                    |
| <b>Last Reviewed Date</b>  | 24/02/2022                                             |
| <b>Next Review Date</b>    | 24/02/2025                                             |
| <b>NSQC Clearance Date</b> | 24/02/2022                                             |

## Qualification Pack

### ELE/N7120: Use REFramework in the RPA software

#### Description

This OS unit is about using the relevant RPA tools. It also covers the implementation of the Robotic Enterprise (RE) Framework.

#### Scope

The scope covers the following :

- Use the relevant RPA tools
- Implement the Robotic Enterprise Framework

#### Elements and Performance Criteria

##### *Use the relevant RPA tools*

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

- PC1.** select an appropriate method to orchestrate the activities in the RPA software
- PC2.** use the relevant RPA tool to manage the creation, monitoring, and deployment of resources in the life cycle of the network
- PC3.** manage the centralised bot management hub using the RPA software
- PC4.** create automated email login and remote data entry applications
- PC5.** select and use other appropriate RPA tools as per the specific requirements

##### *Implement the Robotic Enterprise Framework*

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

- PC6.** create Robotic Enterprise Framework (RE Framework) for logging in, exception handling, application and initialisation
- PC7.** use different REFramework workflows as per the requirement
- PC8.** develop the business process of REFramework
- PC9.** use REFramework to tackle complex business scenarios

#### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the benefits and uses of different RPA tools
- KU2.** use of REFramework and its architecture
- KU3.** different workflows available in REFramework
- KU4.** the process of exception handling and logging
- KU5.** applicable rules for developing a process using REFramework
- KU6.** the three components of the business process
- KU7.** the use of relevant RPA tool for centralised bot management hub for learning and testing purposes



## Qualification Pack

**KU8.** how to create automated email login and remote data entry applications

### Generic Skills (GS)

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

- GS1.** maintain work-related records
- GS2.** read the relevant literature to get the latest updates about the field of work
- GS3.** perform basic calculations
- GS4.** listen attentively to understand the information/ instructions being shared by the speaker
- GS5.** communicate clearly and politely with co-workers and clients
- GS6.** plan and prioritise tasks to ensure timely completion
- GS7.** evaluate all possible solutions to a problem to select the best one
- GS8.** co-ordinate with the co-workers to achieve the work objectives
- GS9.** identify possible disruptions to work and take appropriate preventive measures



## Qualification Pack

### Assessment Criteria

| Assessment Criteria for Outcomes                                                                                                       | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <i>Use the relevant RPA tools</i>                                                                                                      | <b>15</b>    | <b>36</b>       | -             | <b>8</b>   |
| <b>PC1.</b> select an appropriate method to orchestrate the activities in the RPA software                                             | -            | -               | -             | -          |
| <b>PC2.</b> use the relevant RPA tool to manage the creation, monitoring, and deployment of resources in the life cycle of the network | -            | -               | -             | -          |
| <b>PC3.</b> manage the centralised bot management hub using the RPA software                                                           | -            | -               | -             | -          |
| <b>PC4.</b> create automated email login and remote data entry applications                                                            | -            | -               | -             | -          |
| <b>PC5.</b> select and use other appropriate RPA tools as per the specific requirements                                                | -            | -               | -             | -          |
| <i>Implement the Robotic Enterprise Framework</i>                                                                                      | <b>15</b>    | <b>19</b>       | -             | <b>7</b>   |
| <b>PC6.</b> create Robotic Enterprise Framework (RE Framework) for logging in, exception handling, application and initialisation      | -            | -               | -             | -          |
| <b>PC7.</b> use different REFramework workflows as per the requirement                                                                 | -            | -               | -             | -          |
| <b>PC8.</b> develop the business process of REFramework                                                                                | -            | -               | -             | -          |
| <b>PC9.</b> use REFramework to tackle complex business scenarios                                                                       | -            | -               | -             | -          |
| <b>NOS Total</b>                                                                                                                       | <b>30</b>    | <b>55</b>       | -             | <b>15</b>  |

## Qualification Pack

### National Occupational Standards (NOS) Parameters

|                            |                                     |
|----------------------------|-------------------------------------|
| <b>NOS Code</b>            | ELE/N7120                           |
| <b>NOS Name</b>            | Use REFramework in the RPA software |
| <b>Sector</b>              | Electronics                         |
| <b>Sub-Sector</b>          | Industrial Automation               |
| <b>Occupation</b>          | Engineering-I&A                     |
| <b>NSQF Level</b>          | 7                                   |
| <b>Credits</b>             | TBD                                 |
| <b>Version</b>             | 1.0                                 |
| <b>Last Reviewed Date</b>  | 24/02/2022                          |
| <b>Next Review Date</b>    | 24/02/2025                          |
| <b>NSQC Clearance Date</b> | 24/02/2022                          |

## Qualification Pack

### ELE/N7121: Use the robot sensing and machine vision technologies

#### Description

This OS unit is about using robot sensing and machine vision technologies.

#### Scope

The scope covers the following :

- Use robot sensing and machine vision system

#### Elements and Performance Criteria

##### *Use robot sensing and machine vision system*

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

- PC1.** use the appropriate types of sensors in robotics such as active and passive sensors as per the requirement
- PC2.** measure distance using the suitable sensors
- PC3.** detect the change in position, acceleration, force and torque using a contact sensor
- PC4.** detect the presence, distance, and features of the workpiece using a non-contact sensor
- PC5.** use Machine Vision System (MVS) to enable a computing device to inspect, evaluate and identify still or moving images
- PC6.** use the appropriate image processing techniques in the machine vision system
- PC7.** transfer high-resolution pixel arrays to the robot's computer after image processing and analysis
- PC8.** use the sensing, digitisation and windowing techniques in robot sensing
- PC9.** use the binary morphological operations as per the requirement
- PC10.** use camera as per the standard procedure for machine vision
- PC11.** examine the lighting during image processing using the specialised lighting techniques
- PC12.** carry out segmentation following an appropriate method

#### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the use of sensors and sensor-based systems in robotics
- KU2.** the architecture and use of machine vision system in robotics
- KU3.** sensing, digitising, image processing and analysis
- KU4.** the use of robotic assembly sensors and intelligent sensors
- KU5.** visual servo-control
- KU6.** difference between the contact and non-contact sensors
- KU7.** different types of sensors used in robotics such as active, passive, contact and non-contact sensors

## Qualification Pack

- KU8.** various image processing techniques
- KU9.** the binary morphological operations
- KU10.** different types of cameras used for machine vision
- KU11.** different specialised lighting techniques
- KU12.** different methods of segmentation

## Generic Skills (GS)

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

- GS1.** maintain work-related notes and records
- GS2.** read the relevant guides and literature to get the latest information about the field of work
- GS3.** communicate clearly and politely
- GS4.** perform basic calculations
- GS5.** listen attentively to understand the instructions being given
- GS6.** identify appropriate solutions to work-related issues
- GS7.** plan and prioritise tasks to ensure timely completion
- GS8.** take quick decision to deal with workplace emergencies and accidents

## Qualification Pack

### Assessment Criteria

| Assessment Criteria for Outcomes                                                                                                  | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|-----------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <i>Use robot sensing and machine vision system</i>                                                                                | <b>30</b>    | <b>55</b>       | -             | <b>15</b>  |
| <b>PC1.</b> use the appropriate types of sensors in robotics such as active and passive sensors as per the requirement            | -            | -               | -             | -          |
| <b>PC2.</b> measure distance using the suitable sensors                                                                           | -            | -               | -             | -          |
| <b>PC3.</b> detect the change in position, acceleration, force and torque using a contact sensor                                  | -            | -               | -             | -          |
| <b>PC4.</b> detect the presence, distance, and features of the workpiece using a non-contact sensor                               | -            | -               | -             | -          |
| <b>PC5.</b> use Machine Vision System (MVS) to enable a computing device to inspect, evaluate and identify still or moving images | -            | -               | -             | -          |
| <b>PC6.</b> use the appropriate image processing techniques in the machine vision system                                          | -            | -               | -             | -          |
| <b>PC7.</b> transfer high-resolution pixel arrays to the robot's computer after image processing and analysis                     | -            | -               | -             | -          |
| <b>PC8.</b> use the sensing, digitisation and windowing techniques in robot sensing                                               | -            | -               | -             | -          |
| <b>PC9.</b> use the binary morphological operations as per the requirement                                                        | -            | -               | -             | -          |
| <b>PC10.</b> use camera as per the standard procedure for machine vision                                                          | -            | -               | -             | -          |
| <b>PC11.</b> examine the lighting during image processing using the specialised lighting techniques                               | -            | -               | -             | -          |
| <b>PC12.</b> carry out segmentation following an appropriate method                                                               | -            | -               | -             | -          |
| <b>NOS Total</b>                                                                                                                  | <b>30</b>    | <b>55</b>       | -             | <b>15</b>  |

## Qualification Pack

### National Occupational Standards (NOS) Parameters

|                            |                                                       |
|----------------------------|-------------------------------------------------------|
| <b>NOS Code</b>            | ELE/N7121                                             |
| <b>NOS Name</b>            | Use the robot sensing and machine vision technologies |
| <b>Sector</b>              | Electronics                                           |
| <b>Sub-Sector</b>          | Industrial Automation                                 |
| <b>Occupation</b>          | Engineering-I&A                                       |
| <b>NSQF Level</b>          | 7                                                     |
| <b>Credits</b>             | TBD                                                   |
| <b>Version</b>             | 1.0                                                   |
| <b>Last Reviewed Date</b>  | 24/02/2022                                            |
| <b>Next Review Date</b>    | 24/02/2025                                            |
| <b>NSQC Clearance Date</b> | 24/02/2022                                            |

## Qualification Pack

### ELE/N1002: Apply health and safety practices at the workplace

#### Description

This OS unit is about knowledge and practices relating to health, safety and security that candidates need to use in the workplace.

#### Scope

The scope covers the following :

- Deal with workplace hazards
- Apply fire safety practices
- Follow emergencies, rescue and first-aid procedures
- Effective waste management/recycling practices

#### Elements and Performance Criteria

##### *Deal with workplace hazards*

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

- PC1.** identify job-site hazards and possible causes of accident in the workplace
- PC2.** perform work complying to organizational safe working practices and observing hazard signs displayed on containers, equipment and in various work areas such as inside buildings, in open areas and public spaces, etc.
- PC3.** use appropriate personal protective equipment (PPE) for specific tasks and work conditions, contaminant (concentration w.r.t air) requirements and severity of hazard while conforming to the Indian/International standards
- PC4.** follow standard safety procedures while handling tool/ ,equipment, hazardous substances and while working in hazardous environments
- PC5.** dispose electronic waste (such as toxins; metals such as lead, cadmium, barium; flame retardant plastics, welding slag etc.) as per industry approved techniques
- PC6.** avoid damage of components due to negligence in electrostatic discharge (ESD) procedures
- PC7.** locate general health and safety equipment in the workplace such as fire extinguishers; first aid equipment; safety instruments, clothing and installations (fire exits, exhaust fans)
- PC8.** maintain appropriate posture while handling heavy objects
- PC9.** apply good housekeeping practices at all times

##### *Apply fire safety practices*

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

- PC10.** take preventive measures to prevent fire hazards
- PC11.**
  - use appropriate fire extinguishers for different types of fires
  - Types of fires: Class A: e.g. ordinary solid combustibles, such as wood, paper, cloth, plastic, charcoal, etc.; Class B: flammable liquids and gases, such as gasoline, propane, diesel fuel, tar, cooking oil, and similar substances; Class C: e.g. electrical equipment such as appliances, wiring, breaker panels, etc. (These categories of fires become Class A, B, and D fires when the electrical equipment that initiated the fire is no I
- PC12.** exhibit rescue and first-aid techniques in case of fire or electrocution

## Qualification Pack

### *Follow emergencies, rescue and first-aid procedures*

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

- PC13.** administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning etc.
- PC14.** administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock,
- PC15.** participate regularly in emergency procedures such as raising alarm, safe/efficient, evacuation, correct means of taking shelter and escaping, correct assembly point, roll call, correct return to work
- PC16.** use correct method to move injured people and others during an emergency

### *Effective waste management/recycling practices*

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

- PC17.** identify recyclable and non-recyclable, and hazardous waste generated
- PC18.** segregate waste into different categories
- PC19.** ensure disposal of non-recyclable waste appropriately
- PC20.** deposit non-recyclable and reusable material at identified location
- PC21.** follow processes specified for disposal of hazardous waste

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** importance of working in clean and safe work environment following safety practices and procedures
- KU2.** health and safety roles and responsibilities of relevant personnel within and outside the organisation
- KU3.** key internal and external sources of health and safety information
- KU4.** basic knowledge of electronic devices and related health risks
- KU5.** meaning of hazards and risks
- KU6.** various types of health and safety hazards commonly present in the work environment such as physical hazards, electrical hazards, chemical hazards, fire hazards, equipment related hazards, health hazards, etc.
- KU7.** methods of accident prevention
- KU8.** importance of using protective clothing/equipment while working
- KU9.** general principles for identifying and controlling health and safety risks
- KU10.** main hazards and preventive as well as control measures while working with different types of equipment
- KU11.** importance of carrying out electrical and non-electrical isolation to prevent hazards from loss of machine/system/process control
- KU12.** main hazards and preventive as well as control measures when working with electrical systems or using electrical equipment
- KU13.** forms and classifications of hazardous substances
- KU14.** safe working practices while working at various hazardous sites
- KU15.** prevention and control measures to reduce risks from exposure to hazardous substances



## Qualification Pack

- KU16.** health effects associated with exposure to noise and vibration and the appropriate control measures
- KU17.** precautionary activities to prevent the fire accident
- KU18.** various causes of fire such as heating of metal, spontaneous ignition, sparking, electrical eating, loose fires (smoking, welding, etc.) chemical fires etc.
- KU19.** techniques of using the different fire extinguishers
- KU20.** different methods and material to extinguish fires
- KU21.** different materials used for extinguishing fire such as sand, water, foam, CO<sub>2</sub>, dry powder
- KU22.** rescue techniques used during a fire hazard
- KU23.** various types of safety signs and their meaning
- KU24.** basic first aid treatment relevant to the common work place injuries e.g. shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, poisoning, eye injuries
- KU25.** contents of written accident report
- KU26.** potential injuries and ill health associated with incorrect handling of tools and equipment
- KU27.** safe lifting and carrying practices
- KU28.** potential impact to a person who is moved incorrectly
- KU29.** personal safety, health and dignity issues relating to the movement of a person by others
- KU30.** ESD measures and 5S
- KU31.** efficient utilization and management of material and water
- KU32.** ways to recognize common electrical problems and practices of conserving electricity
- KU33.** usage of different colours of dustbins, categorization of waste into dry, wet, recyclable, nonrecyclable and items of single-use plastics
- KU34.** organization's procedure for minimizing waste
- KU35.** waste management and methods of waste disposal
- KU36.** common sources of pollution and ways to minimize it
- KU37.** names, contact information and location of people responsible for health and safety in the workplace
- KU38.** location of documents and equipment for health and safety compliance/practices in the workplace
- KU39.** safety notices, signs and instructions at workplace

## Generic Skills (GS)

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

- GS1.** interpret general health and safety guidelines labels, charts, signages
- GS2.** read operation manuals
- GS3.** write health and safety compliance report
- GS4.** write an accident/incident report in local language or English
- GS5.** provide an emergency or safety incident brief to seniors or relevant authorities in a calm, clear and to-the-point manner
- GS6.** communicate general health and safety guidelines to colleagues/co-workers

## Qualification Pack

- GS7.** communicate appropriately with co-workers in order to clarify instructions and other issues
- GS8.** act in case of any potential hazards observed in the work place
- GS9.** plan and organize their own work schedule, work area, tools, equipment in compliance with organizational policies for health, safety and security
- GS10.** take adequate measures to ensure the safety of clients and visitors at the workplace
- GS11.** identify immediate or temporary solutions to resolve delays
- GS12.** evaluate the work area for health and safety risks or hazards
- GS13.** use cause and effect relations to anticipate potential issues, problems and their solution in the work area related to safety
- GS14.** recognise emergency and potential emergency situations
- GS15.** protect self and others from a health and safety risk or hazard
- GS16.** communicate and collaborate to incorporate sustainable practices (greening) in workplace processes
- GS17.** record data on waste disposal at workplace

## Qualification Pack

### Assessment Criteria

| Assessment Criteria for Outcomes                                                                                                                                                                                                         | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <i>Deal with workplace hazards</i>                                                                                                                                                                                                       | <b>20</b>    | <b>31</b>       | -             | -          |
| <b>PC1.</b> identify job-site hazards and possible causes of accident in the workplace                                                                                                                                                   | 2            | 3               | -             | -          |
| <b>PC2.</b> perform work complying to organizational safe working practices and observing hazard signs displayed on containers, equipment and in various work areas such as inside buildings, in open areas and public spaces, etc.      | 3            | 4               | -             | -          |
| <b>PC3.</b> use appropriate personal protective equipment (PPE) for specific tasks and work conditions, contaminant (concentration w.r.t air) requirements and severity of hazard while conforming to the Indian/International standards | 3            | 4               | -             | -          |
| <b>PC4.</b> follow standard safety procedures while handling tool/ ,equipment, hazardous substances and while working in hazardous environments                                                                                          | 3            | 4               | -             | -          |
| <b>PC5.</b> dispose electronic waste (such as toxins; metals such as lead, cadmium, barium; flame retardant plastics, welding slag etc.) as per industry approved techniques                                                             | 2            | 4               | -             | -          |
| <b>PC6.</b> avoid damage of components due to negligence in electrostatic discharge (ESD) procedures                                                                                                                                     | 2            | 3               | -             | -          |
| <b>PC7.</b> locate general health and safety equipment in the workplace such as fire extinguishers; first aid equipment; safety instruments, clothing and installations (fire exits, exhaust fans)                                       | 2            | 3               | -             | -          |
| <b>PC8.</b> maintain appropriate posture while handling heavy objects                                                                                                                                                                    | 1            | 3               | -             | -          |
| <b>PC9.</b> apply good housekeeping practices at all times                                                                                                                                                                               | 2            | 3               | -             | -          |
| <i>Apply fire safety practices</i>                                                                                                                                                                                                       | <b>4</b>     | <b>9</b>        | -             | -          |
| <b>PC10.</b> take preventive measures to prevent fire hazards                                                                                                                                                                            | 2            | 3               | -             | -          |

### Qualification Pack

| Assessment Criteria for Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>PC11.</b> <ul style="list-style-type: none"> <li>• use appropriate fire extinguishers for different types of fires</li> <li>• Types of fires: Class A: e.g. ordinary solid combustibles, such as wood, paper, cloth, plastic, charcoal, etc.; Class B: flammable liquids and gases, such as gasoline, propane, diesel fuel, tar, cooking oil, and similar substances; Class C: e.g. electrical equipment such as appliances, wiring, breaker panels, etc. (These categories of fires become Class A, B, and D fires when the electrical equipment that initiated the fire is no I</li> </ul> | 1            | 3               | -             | -          |
| <b>PC12.</b> exhibit rescue and first-aid techniques in case of fire or electrocution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1            | 3               | -             | -          |
| <i>Follow emergencies, rescue and first-aid procedures</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>6</b>     | <b>13</b>       | -             | -          |
| <b>PC13.</b> administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1            | 3               | -             | -          |
| <b>PC14.</b> administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1            | 2               | -             | -          |
| <b>PC15.</b> participate regularly in emergency procedures such as raising alarm, safe/efficient, evacuation, correct means of taking shelter and escaping, correct assembly point, roll call, correct return to work                                                                                                                                                                                                                                                                                                                                                                           | 2            | 4               | -             | -          |
| <b>PC16.</b> use correct method to move injured people and others during an emergency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2            | 4               | -             | -          |
| <i>Effective waste management/recycling practices</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>5</b>     | <b>12</b>       | -             | -          |
| <b>PC17.</b> identify recyclable and non-recyclable, and hazardous waste generated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1            | 3               | -             | -          |
| <b>PC18.</b> segregate waste into different categories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1            | 2               | -             | -          |
| <b>PC19.</b> ensure disposal of non-recyclable waste appropriately                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1            | 2               | -             | -          |
| <b>PC20.</b> deposit non-recyclable and reusable material at identified location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1            | 3               | -             | -          |

### Qualification Pack

| Assessment Criteria for Outcomes                                        | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|-------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>PC21.</b> follow processes specified for disposal of hazardous waste | 1            | 2               | -             | -          |
| <b>NOS Total</b>                                                        | <b>35</b>    | <b>65</b>       | -             | -          |

## Qualification Pack

### National Occupational Standards (NOS) Parameters

|                            |                                                    |
|----------------------------|----------------------------------------------------|
| <b>NOS Code</b>            | ELE/N1002                                          |
| <b>NOS Name</b>            | Apply health and safety practices at the workplace |
| <b>Sector</b>              | Electronics                                        |
| <b>Sub-Sector</b>          | Generic                                            |
| <b>Occupation</b>          | Generic - Health Safety                            |
| <b>NSQF Level</b>          | 4                                                  |
| <b>Credits</b>             | TBD                                                |
| <b>Version</b>             | 3.0                                                |
| <b>Last Reviewed Date</b>  | 24/02/2022                                         |
| <b>Next Review Date</b>    | 24/02/2025                                         |
| <b>NSQC Clearance Date</b> | 24/02/2022                                         |

## Qualification Pack

### DGT/VSQ/N0103: Employability Skills (90 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.** understand the significance of employability skills in meeting the current job market requirement and future of work
- PC2.** identify and explore learning and employability relevant portals
- PC3.** research about the different industries, job market trends, latest skills required and the available opportunities

##### *Constitutional values – Citizenship*

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

- PC4.** 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.
- PC5.** follow environmentally sustainable practices

##### *Becoming a Professional in the 21st Century*

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

- PC6.** recognize the significance of 21st Century Skills for employment

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- PC7.** 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
- PC8.** adopt a continuous learning mindset for personal and professional development

### *Basic English Skills*

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

- PC9.** use basic English for everyday conversation in different contexts, in person and over the telephone
- PC10.** read and understand routine information, notes, instructions, mails, letters etc. written in English
- PC11.** 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:

- PC12.** identify career goals based on the skills, interests, knowledge, and personal attributes
- PC13.** prepare a career development plan with short- and long-term goals

### *Communication Skills*

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

- PC14.** follow verbal and non-verbal communication etiquette while communicating in professional and public settings
- PC15.** use active listening techniques for effective communication
- PC16.** communicate in writing using appropriate style and format based on formal or informal requirements
- PC17.** work collaboratively with others in a team

### *Diversity & Inclusion*

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

- PC18.** communicate and behave appropriately with all genders and PwD
- PC19.** 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:

- PC20.** identify and select reliable institutions for various financial products and services such as bank account, debit and credit cards, loans, insurance etc.
- PC21.** carry out offline and online financial transactions, safely and securely, using various methods and check the entries in the passbook
- PC22.** identify common components of salary and compute income, expenses, taxes, investments etc
- PC23.** 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:

- PC24.** operate digital devices and use their features and applications securely and safely
- PC25.** carry out basic internet operations by connecting to the internet safely and securely, using the mobile data or other available networks through Bluetooth, Wi-Fi, etc.
- PC26.** display responsible online behaviour while using various social media platforms



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- PC27.** create a personal email account, send and process received messages as per requirement
- PC28.** carry out basic procedures in documents, spreadsheets and presentations using respective and appropriate applications
- PC29.** utilize virtual collaboration tools to work effectively

### *Entrepreneurship*

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

- PC30.** identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research
- PC31.** develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion
- PC32.** 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:

- PC33.** identify different types of customers and ways to communicate with them
- PC34.** identify and respond to customer requests and needs in a professional manner
- PC35.** use appropriate tools to collect customer feedback
- PC36.** follow appropriate hygiene and grooming standards

### *Getting ready for apprenticeship & Jobs*

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

- PC37.** create a professional Curriculum vitae (Résumé)
- PC38.** search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively
- PC39.** apply to identified job openings using offline /online methods as per requirement
- PC40.** answer questions politely, with clarity and confidence, during recruitment and selection
- PC41.** 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

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- KU11.** components of salary and 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
- KU16.** use applications such as word processors, spreadsheets etc.
- KU17.** how to identify business opportunities
- KU18.** types and needs of customers
- KU19.** how to apply for a job and prepare for an interview
- KU20.** 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 in English and other languages
- GS2.** communicate effectively using appropriate language in formal and informal settings
- GS3.** behave politely and appropriately with all to maintain effective work relationship
- GS4.** how to work in a virtual mode, using various technological platforms
- 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>                                                                                                                                                                                                                                                                      | <b>1</b>     | <b>1</b>        | -             | -          |
| <b>PC1.</b> understand the significance of employability skills in meeting the current job market requirement and future of work                                                                                                                                                                                 | -            | -               | -             | -          |
| <b>PC2.</b> identify and explore learning and employability relevant portals                                                                                                                                                                                                                                     | -            | -               | -             | -          |
| <b>PC3.</b> research about the different industries, job market trends, latest skills required and the available opportunities                                                                                                                                                                                   | -            | -               | -             | -          |
| <i>Constitutional values – Citizenship</i>                                                                                                                                                                                                                                                                       | <b>1</b>     | <b>1</b>        | -             | -          |
| <b>PC4.</b> 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.                                                               | -            | -               | -             | -          |
| <b>PC5.</b> follow environmentally sustainable practices                                                                                                                                                                                                                                                         | -            | -               | -             | -          |
| <i>Becoming a Professional in the 21st Century</i>                                                                                                                                                                                                                                                               | <b>1</b>     | <b>3</b>        | -             | -          |
| <b>PC6.</b> recognize the significance of 21st Century Skills for employment                                                                                                                                                                                                                                     | -            | -               | -             | -          |
| <b>PC7.</b> 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 | -            | -               | -             | -          |
| <b>PC8.</b> adopt a continuous learning mindset for personal and professional development                                                                                                                                                                                                                        | -            | -               | -             | -          |
| <i>Basic English Skills</i>                                                                                                                                                                                                                                                                                      | <b>3</b>     | <b>4</b>        | -             | -          |
| <b>PC9.</b> use basic English for everyday conversation in different contexts, in person and over the telephone                                                                                                                                                                                                  | -            | -               | -             | -          |

## Qualification Pack

| Assessment Criteria for Outcomes                                                                                                                                       | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>PC10.</b> read and understand routine information, notes, instructions, mails, letters etc. written in English                                                      | -            | -               | -             | -          |
| <b>PC11.</b> write short messages, notes, letters, e-mails etc. in English                                                                                             | -            | -               | -             | -          |
| <i>Career Development &amp; Goal Setting</i>                                                                                                                           | <b>1</b>     | <b>2</b>        | -             | -          |
| <b>PC12.</b> identify career goals based on the skills, interests, knowledge, and personal attributes                                                                  | -            | -               | -             | -          |
| <b>PC13.</b> prepare a career development plan with short- and long-term goals                                                                                         | -            | -               | -             | -          |
| <i>Communication Skills</i>                                                                                                                                            | <b>2</b>     | <b>2</b>        | -             | -          |
| <b>PC14.</b> follow verbal and non-verbal communication etiquette while communicating in professional and public settings                                              | -            | -               | -             | -          |
| <b>PC15.</b> use active listening techniques for effective communication                                                                                               | -            | -               | -             | -          |
| <b>PC16.</b> communicate in writing using appropriate style and format based on formal or informal requirements                                                        | -            | -               | -             | -          |
| <b>PC17.</b> work collaboratively with others in a team                                                                                                                | -            | -               | -             | -          |
| <i>Diversity &amp; Inclusion</i>                                                                                                                                       | <b>1</b>     | <b>1</b>        | -             | -          |
| <b>PC18.</b> communicate and behave appropriately with all genders and PwD                                                                                             | -            | -               | -             | -          |
| <b>PC19.</b> escalate any issues related to sexual harassment at workplace according to POSH Act                                                                       | -            | -               | -             | -          |
| <i>Financial and Legal Literacy</i>                                                                                                                                    | <b>2</b>     | <b>3</b>        | -             | -          |
| <b>PC20.</b> identify and select reliable institutions for various financial products and services such as bank account, debit and credit cards, loans, insurance etc. | -            | -               | -             | -          |
| <b>PC21.</b> carry out offline and online financial transactions, safely and securely, using various methods and check the entries in the passbook                     | -            | -               | -             | -          |

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| Assessment Criteria for Outcomes                                                                                                                                                     | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>PC22.</b> identify common components of salary and compute income, expenses, taxes, investments etc                                                                               | -            | -               | -             | -          |
| <b>PC23.</b> identify relevant rights and laws and use legal aids to fight against legal exploitation                                                                                | -            | -               | -             | -          |
| <i>Essential Digital Skills</i>                                                                                                                                                      | <b>3</b>     | <b>5</b>        | -             | -          |
| <b>PC24.</b> operate digital devices and use their features and applications securely and safely                                                                                     | -            | -               | -             | -          |
| <b>PC25.</b> carry out basic internet operations by connecting to the internet safely and securely, using the mobile data or other available networks through Bluetooth, Wi-Fi, etc. | -            | -               | -             | -          |
| <b>PC26.</b> display responsible online behaviour while using various social media platforms                                                                                         | -            | -               | -             | -          |
| <b>PC27.</b> create a personal email account, send and process received messages as per requirement                                                                                  | -            | -               | -             | -          |
| <b>PC28.</b> carry out basic procedures in documents, spreadsheets and presentations using respective and appropriate applications                                                   | -            | -               | -             | -          |
| <b>PC29.</b> utilize virtual collaboration tools to work effectively                                                                                                                 | -            | -               | -             | -          |
| <i>Entrepreneurship</i>                                                                                                                                                              | <b>2</b>     | <b>3</b>        | -             | -          |
| <b>PC30.</b> identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research                                           | -            | -               | -             | -          |
| <b>PC31.</b> develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion                                                          | -            | -               | -             | -          |
| <b>PC32.</b> identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity                                               | -            | -               | -             | -          |
| <i>Customer Service</i>                                                                                                                                                              | <b>1</b>     | <b>2</b>        | -             | -          |
| <b>PC33.</b> identify different types of customers and ways to communicate with them                                                                                                 | -            | -               | -             | -          |

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| Assessment Criteria for Outcomes                                                                                                                                                 | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>PC34.</b> identify and respond to customer requests and needs in a professional manner                                                                                        | -            | -               | -             | -          |
| <b>PC35.</b> use appropriate tools to collect customer feedback                                                                                                                  | -            | -               | -             | -          |
| <b>PC36.</b> follow appropriate hygiene and grooming standards                                                                                                                   | -            | -               | -             | -          |
| <i>Getting ready for apprenticeship &amp; Jobs</i>                                                                                                                               | <b>2</b>     | <b>3</b>        | -             | -          |
| <b>PC37.</b> create a professional Curriculum vitae (Résumé)                                                                                                                     | -            | -               | -             | -          |
| <b>PC38.</b> search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively | -            | -               | -             | -          |
| <b>PC39.</b> apply to identified job openings using offline /online methods as per requirement                                                                                   | -            | -               | -             | -          |
| <b>PC40.</b> answer questions politely, with clarity and confidence, during recruitment and selection                                                                            | -            | -               | -             | -          |
| <b>PC41.</b> identify apprenticeship opportunities and register for it as per guidelines and requirements                                                                        | -            | -               | -             | -          |
| <b>NOS Total</b>                                                                                                                                                                 | <b>20</b>    | <b>30</b>       | -             | -          |

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### National Occupational Standards (NOS) Parameters

|                            |                                 |
|----------------------------|---------------------------------|
| <b>NOS Code</b>            | DGT/VSQ/N0103                   |
| <b>NOS Name</b>            | Employability Skills (90 Hours) |
| <b>Sector</b>              | Cross Sectoral                  |
| <b>Sub-Sector</b>          | Professional Skills             |
| <b>Occupation</b>          | Employability                   |
| <b>NSQF Level</b>          | 5                               |
| <b>Credits</b>             | 3                               |
| <b>Version</b>             | 1.0                             |
| <b>Last Reviewed Date</b>  | 30/04/2024                      |
| <b>Next Review Date</b>    | 30/04/2027                      |
| <b>NSQC Clearance Date</b> | 30/04/2024                      |

## 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/optional /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

## Qualification Pack

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.

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  |
|-------------------------------------------------------------------------|--------------|-----------------|---------------|------------|-------------|------------|
| ELE/N7117.Use the appropriate Robotic Process Automation (RPA) software | 30           | 55              | -             | 15         | 100         | 15         |
| ELE/N7118.Integrate robot manipulators with process components          | 30           | 55              | -             | 15         | 100         | 15         |
| ELE/N7119.Perform source control integration in the RPA software        | 30           | 55              | -             | 15         | 100         | 20         |
| ELE/N7120.Use Orchestrator and REFramework in UiPath                    | 30           | 55              | -             | 15         | 100         | 15         |
| ELE/N7121.Use the robot sensing and machine vision technologies         | 30           | 55              | -             | 15         | 100         | 15         |
| ELE/N1002.Apply health and safety practices at the workplace            | 35           | 65              | -             | -          | 100         | 10         |
| DGT/VSQ/N0103.Employability Skills (90 Hours)                           | 20           | 30              | -             | -          | 50          | 10         |
| <b>Total</b>                                                            | <b>205</b>   | <b>370</b>      | <b>-</b>      | <b>75</b>  | <b>650</b>  | <b>100</b> |



## Qualification Pack

### Acronyms

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

## Qualification Pack

### Glossary

|                                              |                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sector</b>                                | 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.                                                                      |
| <b>Sub-sector</b>                            | Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.                                                                                                                                                                                     |
| <b>Occupation</b>                            | Occupation is a set of job roles, which perform similar/ related set of functions in an industry.                                                                                                                                                                                                |
| <b>Job role</b>                              | Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.                                                                                                                                                                                |
| <b>Occupational Standards (OS)</b>           | 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. |
| <b>Performance Criteria (PC)</b>             | Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.                                                                                                                                                                    |
| <b>National Occupational Standards (NOS)</b> | NOS are occupational standards which apply uniquely in the Indian context.                                                                                                                                                                                                                       |
| <b>Qualifications Pack (QP)</b>              | 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.                                                                                                                       |
| <b>Unit Code</b>                             | Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'                                                                                                                                                                                                        |
| <b>Unit Title</b>                            | Unit title gives a clear overall statement about what the incumbent should be able to do.                                                                                                                                                                                                        |
| <b>Description</b>                           | 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.                                                                                                                   |
| <b>Scope</b>                                 | 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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|                                         |                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Knowledge and Understanding (KU)</b> | 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.                                                                                                                                               |
| <b>Organisational Context</b>           | 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.                                                                                                                                                                       |
| <b>Technical Knowledge</b>              | Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.                                                                                                                                                                                                                                                               |
| <b>Core Skills/ Generic Skills (GS)</b> | 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. |
| <b>Electives</b>                        | 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.                                                                            |
| <b>Options</b>                          | 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.                                                                                                                                                          |