



# EMS Operation & Maintenance Manager

QP Code: ELE/Q5312

Version: 2.0

NSQF Level: 6

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## Qualification Pack

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## Qualification Pack

### ELE/Q5312: EMS Operation & Maintenance Manager

#### Brief Job Description

Electronics Manufacturing Services Operation & Maintenance Manager in this job plans production targets of SMT machines and ensures that all the resources to perform the tasks are in a good working condition. The individual should have understanding of Electronic Manufacturing Service (contract manufacturing) and should be able to maintain the SMT production processes and relevant equipment.

#### Personal Attributes

The individual need to have a high level of manual dexterity/capability and need to have basic understanding of Electronic Manufacturing Service (Contract manufacturing). They also need to be good communicators and listeners and should be able to solve problems independently.

#### Applicable National Occupational Standards (NOS)

##### Compulsory NOS:

1. [ELE/N5313: Manage SMT machines](#)
2. [ELE/N5314: Manage production process, material quality and machines](#)
3. [ELE/N9905: Work effectively at the workplace](#)
4. [ELE/N1002: Apply health and safety practices at the workplace](#)

#### Qualification Pack (QP) Parameters

<b>Sector</b>	Electronics
<b>Sub-Sector</b>	Electronics Manufacturing System
<b>Occupation</b>	Manufacturing
<b>Country</b>	India
<b>NSQF Level</b>	6
<b>Credits</b>	NA
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/2152.9900



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<b>Minimum Educational Qualification &amp; Experience</b>	Diploma ((after 12th) in relevant trade) with 4 Years of experience in the relevant field OR B.E./B.Tech ((Degree in Electrical or Electronics Engineering) with 02 Year of relevant Experience OR M.E/M.Tech in Electrical or Electronics Engineering)) OR Certificate-NSQF (Level-4 in EMS Technician) with 4 Years of experience in the relevant field
<b>Minimum Level of Education for Training in School</b>	
<b>Pre-Requisite License or Training</b>	NA
<b>Minimum Job Entry Age</b>	25 Years
<b>Last Reviewed On</b>	27/01/2022
<b>Next Review Date</b>	02/06/2025
<b>Deactivation Date</b>	02/06/2025
<b>NSQC Approval Date</b>	27/01/2022
<b>Version</b>	2.0
<b>Reference code on NQR</b>	2022/EHW/ESSC/05135
<b>NQR Version</b>	1.0

### Remarks:

NA



## Qualification Pack

### ELE/N5313: Manage SMT machines

#### Description

This OS unit is about management of Surface Mount Technology (SMT) machines, Controlling the machine working procedure and maintenance. The individual must comply with related occupational health & safety guidelines while carrying out the Work.

#### Scope

The scope covers the following :

- Manage SMT machines
- Maintain Documentation

#### Elements and Performance Criteria

##### *Manage SMT machines*

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

- PC1.** identify magazine loader to supply Printed Circuit Board (PCB) for production
- PC2.** guide the un-loader to unload the assembled PCB
- PC3.** set up chart for screen printer parameters such as program name, squeeze speed, 2D inspection mode, etc.
- PC4.** verify the specification of stencil mask and order the new stencil
- PC5.** oversee the selected feeder and nozzle as per the product
- PC6.** ensure that part library and shift data are as per the standard guidelines
- PC7.** ensure that the program has been created and executed as per the standard procedure
- PC8.** advise resolution of errors if the machine gets stuck due to any reason
- PC9.** guide the engineer for setting the soaking temperature profile to maintain the temperature for air reflow oven and Nitrogen (N<sub>2</sub>) reflow oven and preparing the model-wise dummy PCB as per procedure
- PC10.** monitor each process to ensure quality of product with zero defects
- PC11.** observe the feedback for any defects through Automated Optical Inspector (AOI) and take corrective actions
- PC12.** guide the solder paste inspector to modify inspection part library for solder short, missing, shift, etc.
- PC13.** supervise the program and debug it for false call
- PC14.** check critical operating check points as per the standard check sheet
- PC15.** plan and adhere to the model changeover procedure as per production planning
- PC16.** ensure that the machine is in a good working condition and maintenance is carried out as per the schedule

##### *Maintain Documentation*

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

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- PC17.** organise daily, weekly and monthly preventive maintenance schedule as per the recommendation from the manufacturer
- PC18.** maintain required documents as per the company policy documents: production report, work instructions, operating checkpoint, maintenance check-sheet, etc.

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** companys policies on: incentives, delivery standards, and personnel management
- KU2.** work flow involved in assembly process of the company
- KU3.** importance of the individuals role in the workflow
- KU4.** reporting structure, inter-dependent functions, lines and procedures in the work area
- KU5.** importance of working in clean and safe environment practices and procedures
- KU6.** relevant people and their responsibilities within the work area
- KU7.** standard operating procedures in the organisation such as magazine & pcb loading procedure, changeover procedure
- KU8.** basic knowledge of electronics devices
- KU9.** knowledge of various parts used in printed circuit board (pcb) assembly process
- KU10.** basic knowledge of surface-mount technology (smt) machines
- KU11.** effective training methodologies to develop quality culture in the organization
- KU12.** troubleshooting approaches - root cause analysis
- KU13.** terms and conditions of manufacturing
- KU14.** knowledge of 5s & electro static discharge (esd) measures
- KU15.** knowledge and awareness of all safety rules, policies and procedures, quality standards to be followed in the process
- KU16.** basic knowledge of surface mount technology & its devices
- KU17.** production planning and scheduling
- KU18.** how to prepare work instructions
- KU19.** how to read component drawing and interpret bill of material (bom)
- KU20.** methods to identify operational problems
- KU21.** important terms used in the production
- KU22.** importance of standard operating procedures
- KU23.** how to interpret manufacturers instructions
- KU24.** various tools used to measure progress to target
- KU25.** test protocols for visual and functional testing of electrical parts and assemblies

### Generic Skills (GS)

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

- GS1.** develop work instructions

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- GS2.** prepare various production reports
- GS3.** indent components as per the Bill of Material (BOM)
- GS4.** prepare machine breakdown reports, incident reports etc.
- GS5.** read warnings, instructions and other text material on product labels, components, etc.
- GS6.** read component and assembly drawings
- GS7.** interpret work instructions and sequence of operations
- GS8.** interpret various quality standards
- GS9.** interpret test results
- GS10.** provide instructions to technicians and inspectors
- GS11.** interact with suppliers and machine manufacturers to seek clarifications
- GS12.** act immediately in case of machine breakdown or quality issues
- GS13.** escalate unresolved problems
- GS14.** sequence activities in case of a new product
- GS15.** organize resources for production
- GS16.** sequence activities as per work instructions establish testing methods
- GS17.** interact with internal and external stakeholders politely
- GS18.** provide 100% defect free products within the stipulated time period
- GS19.** respond to emergency situations
- GS20.** act in case of machine breakdown
- GS21.** handle quality deviation issues
- GS22.** interpret accurately drawings, wiring and instructions
- GS23.** improve the production process continually

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Manage SMT machines</i>	<b>36</b>	<b>45</b>	-	<b>10</b>
<b>PC1.</b> identify magazine loader to supply Printed Circuit Board (PCB) for production	2	3	-	-
<b>PC2.</b> guide the un-loader to unload the assembled PCB	2	3	-	-
<b>PC3.</b> set up chart for screen printer parameters such as program name, squeeze speed, 2D inspection mode, etc.	2	3	-	-
<b>PC4.</b> verify the specification of stencil mask and order the new stencil	3	3	-	1
<b>PC5.</b> oversee the selected feeder and nozzle as per the product	3	3	-	1
<b>PC6.</b> ensure that part library and shift data are as per the standard guidelines	2	2	-	-
<b>PC7.</b> ensure that the program has been created and executed as per the standard procedure	2	3	-	1
<b>PC8.</b> advise resolution of errors if the machine gets stuck due to any reason	2	3	-	1
<b>PC9.</b> guide the engineer for setting the soaking temperature profile to maintain the temperature for air reflow oven and Nitrogen (N <sub>2</sub> ) reflow oven and preparing the model-wise dummy PCB as per procedure	2	3	-	1
<b>PC10.</b> monitor each process to ensure quality of product with zero defects	2	3	-	1
<b>PC11.</b> observe the feedback for any defects through Automated Optical Inspector (AOI) and take corrective actions	2	3	-	1
<b>PC12.</b> guide the solder paste inspector to modify inspection part library for solder short, missing, shift, etc.	3	2	-	1

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC13.</b> supervise the program and debug it for false call	2	3	-	1
<b>PC14.</b> check critical operating check points as per the standard check sheet	2	3	-	1
<b>PC15.</b> plan and adhere to the model changeover procedure as per production planning	3	2	-	-
<b>PC16.</b> ensure that the machine is in a good working condition and maintenance is carried out as per the schedule	2	3	-	-
<i>Maintain Documentation</i>	<b>4</b>	<b>5</b>	-	-
<b>PC17.</b> organise daily, weekly and monthly preventive maintenance schedule as per the recommendation from the manufacturer	2	2	-	-
<b>PC18.</b> maintain required documents as per the company policy documents: production report, work instructions, operating checkpoint, maintenance check-sheet, etc.	2	3	-	-
<b>NOS Total</b>	<b>40</b>	<b>50</b>	-	<b>10</b>



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### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ELE/N5313
<b>NOS Name</b>	Manage SMT machines
<b>Sector</b>	Electronics
<b>Sub-Sector</b>	Electronics Manufacturing System
<b>Occupation</b>	Manufacturing
<b>NSQF Level</b>	6
<b>Credits</b>	TBD
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	27/01/2022
<b>Next Review Date</b>	02/06/2025
<b>NSQC Clearance Date</b>	27/01/2022

## Qualification Pack

### ELE/N5314: Manage production process, material quality and machines

#### Description

This OS unit is about controlling, production process, SMT material, consumables, equipment and spare parts, controlling of the quality of assembled electronics product, management of full line, maintenance of machines and controlling the documents of all stages of SMT line.

#### Scope

The scope covers the following :

- Control SMT material, consumables, equipment & spare parts
- Plan production processes
- Monitor and control PCBA quality
- Maintenance of assembly line
- Carryout documentation

#### Elements and Performance Criteria

##### *Control SMT material, consumables, equipment & spare parts*

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

- PC1.** identify material supply and in/out process
- PC2.** handle the material control procedure and Bill Of Material (BOM)
- PC3.** oversee the process of setting up the kitting system
- PC4.** check storage check point for in/out process
- PC5.** monitor consumable control procedure for smooth functioning
- PC6.** supervise the setting up of line to facilitate installation of equipment and equipment levelling
- PC7.** verify the equipment history card and spare parts master list

##### *Plan production processes*

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

- PC8.** check the line production capability including operational loss
- PC9.** lead the team for product production plan with agreed scheduled
- PC10.** monitor the processes and machine down time to ensure that the operational and product efficiency are as per standards

##### *Monitor and control PCBA quality*

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

- PC11.** ensure that the quality data is controlled in PPM and not in percentage
- PC12.** verify the record quality data and monitoring report as per company policies
- PC13.** check for quality defects to achieve highest quality standards and take corrective actions

##### *Maintenance of assembly line*

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

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- PC14.** monitor and manage the production process from loading bare PCB in loader to screen printer printing, solder paste inspection, mounting of components, soldering in reflow oven, inspection by AOI and un-loading of populated PCB in magazine rack
- PC15.** verify that there is no shut down of machine due to improper maintenance
- PC16.** ensure that regular cleaning and lubrication processes are carried out as prescribed by manufacturers
- PC17.** identify defects in process and take immediate corrective action on any accidents occurring during process

### *Carryout documentation*

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

- PC18.** organise reports, procedures, work instructions, setup chart and check-sheets as recommended
- PC19.** ensure that correct and accurate production quantity is entered in the report

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** companys policies on incentives, delivery standards, and personnel management
- KU2.** work flow involved in the assembly process of the company ka3. importance of the individuals role in the workflow
- KU3.** importance of the individuals role in the workflow
- KU4.** reporting structure, inter-dependent functions, lines and procedures in the work area
- KU5.** importance of working in clean and safe environment practices and procedures
- KU6.** relevant people and their responsibilities within the work area
- KU7.** basic knowledge of surface mount technology
- KU8.** component drawing and interpret bill of material (BOM)
- KU9.** how to calculate rlc (r-resistance, l- inductance, c- capacitor) values and read their polarity
- KU10.** material handling & material in/out control
- KU11.** how to read component drawing and interpret bill of material (BOM)
- KU12.** how to identify the component locations & type on PCB
- KU13.** basic knowledge of SMTmachines & spare parts
- KU14.** importance of standard operating procedures
- KU15.** how to interpret manufacturers instructions
- KU16.** various tools used to measure progress to target
- KU17.** how to estimate costs involved in each stage of production
- KU18.** effective training methodologies to develop quality culture in the organization
- KU19.** importance of work instructions and workmanship
- KU20.** how to provide manufacturing data manufacturing data: production control charts, reliability, process capability etc.
- KU21.** various quality standards used in the production and their importance
- KU22.** knowledge of 5s & electro static discharge (esd) measures

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**KU23.** knowledge and awareness of all safety rules, policies and procedures, quality

**KU24.** standards to be followed in the process

### Generic Skills (GS)

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

- GS1.** prepare various management reports on the performance
- GS2.** prepare staff training calendar
- GS3.** prepare escalation reports
- GS4.** interpret production control charts
- GS5.** read various process improvement documents
- GS6.** interpret Quality Management System (QMS)
- GS7.** read job and specification sheet and technical writing
- GS8.** provide instructions to technicians and quality inspectors
- GS9.** interact with suppliers and machine manufacturers to seek clarifications
- GS10.** interact with competent authority for any clarification or advice
- GS11.** communicate with competent authority regarding performance of the shop floor
- GS12.** act independently in case of machine breakdown or quality issues
- GS13.** escalate unresolved problems
- GS14.** sequence activities in case of a new product
- GS15.** identify resources for data gathering
- GS16.** organize data and generate reports as per the schedule
- GS17.** provide reports to competent authority as per the guidelines
- GS18.** communicate with internal /external stakeholders politely
- GS19.** check for the erroneous data and the actions to be taken to correct the data
- GS20.** interpret accurately drawings and instructions
- GS21.** improve work processes

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Control SMT material, consumables, equipment &amp; spare parts</i>	<b>16</b>	<b>18</b>	-	<b>6</b>
<b>PC1.</b> identify material supply and in/out process	2	2	-	1
<b>PC2.</b> handle the material control procedure and Bill Of Material (BOM)	2	3	-	1
<b>PC3.</b> oversee the process of setting up the kitting system	2	3	-	1
<b>PC4.</b> check storage check point for in/out process	2	3	-	-
<b>PC5.</b> monitor consumable control procedure for smooth functioning	3	3	-	1
<b>PC6.</b> supervise the setting up of line to facilitate installation of equipment and equipment levelling	3	2	-	1
<b>PC7.</b> verify the equipment history card and spare parts master list	2	2	-	1
<i>Plan production processes</i>	<b>6</b>	<b>9</b>	-	<b>2</b>
<b>PC8.</b> check the line production capability including operational loss	2	3	-	1
<b>PC9.</b> lead the team for product production plan with agreed scheduled	2	3	-	-
<b>PC10.</b> monitor the processes and machine down time to ensure that the operational and product efficiency are as per standards	2	3	-	1
<i>Monitor and control PCBA quality</i>	<b>6</b>	<b>9</b>	-	<b>2</b>
<b>PC11.</b> ensure that the quality data is controlled in PPM and not in percentage	2	3	-	1
<b>PC12.</b> verify the record quality data and monitoring report as per company policies	2	3	-	1

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC13.</b> check for quality defects to achieve highest quality standards and take corrective actions	2	3	-	-
<i>Maintenance of assembly line</i>	<b>9</b>	<b>11</b>	-	-
<b>PC14.</b> monitor and manage the production process from loading bare PCB in loader to screen printer printing, solder paste inspection, mounting of components, soldering in reflow oven, inspection by AOI and un-loading of populated PCB in magazine rack	3	3	-	-
<b>PC15.</b> verify that there is no shut down of machine due to improper maintenance	2	3	-	-
<b>PC16.</b> ensure that regular cleaning and lubrication processes are carried out as prescribed by manufacturers	2	2	-	-
<b>PC17.</b> identify defects in process and take immediate corrective action on any accidents occurring during process	2	3	-	-
<i>Carryout documentation</i>	<b>3</b>	<b>3</b>	-	-
<b>PC18.</b> organise reports, procedures, work instructions, setup chart and check-sheets as recommended	1	3	-	-
<b>PC19.</b> ensure that correct and accurate production quantity is entered in the report	2	-	-	-
<b>NOS Total</b>	<b>40</b>	<b>50</b>	-	<b>10</b>



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### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ELE/N5314
<b>NOS Name</b>	Manage production process, material quality and machines
<b>Sector</b>	Electronics
<b>Sub-Sector</b>	Electronics Manufacturing System
<b>Occupation</b>	Manufacturing
<b>NSQF Level</b>	6
<b>Credits</b>	TBD
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	27/01/2022
<b>Next Review Date</b>	02/06/2025
<b>NSQC Clearance Date</b>	27/01/2022

## Qualification Pack

### ELE/N9905: Work effectively at the workplace

#### Description

This unit is about the communicating and managing work effectively at the workplace as well as taking measures to enhance own competence and working in a disciplined and ethical manner.

#### Elements and Performance Criteria

##### *Communicate effectively at the workplace*

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

- PC1.** exchange information and instructions with others at the workplace clearly, accurately and within agreed timelines
- PC2.** seek clarification to obtain complete information and confirm understanding while receiving communications
- PC3.** display helpful behaviour by assisting others in performing tasks where required
- PC4.** follow communication etiquette while working to convey politeness, assertiveness, care and professionalism
- PC5.** share all relevant information with stakeholders in agreed formats and as per agreed timelines

##### *Work in an effective manner*

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

- PC6.** identify and obtain clarity regarding organisational, team and own goals and targets
- PC7.** prioritise and plan work in order to achieve goals and targets
- PC8.** monitor own and team performance as per agreed plan
- PC9.** complete duties accurately, systematically and within required timeframes
- PC10.** maintain orderliness and cleanliness in the work area

##### *Maintain and enhance professional competence*

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

- PC11.** identify own strengths and weaknesses in relation to goals and targets
- PC12.** select opportunities for continuous learning and maintaining currency of professional practice
- PC13.** develop a professional development plan to enhance professional capabilities
- PC14.** examine developments and trends in field of work and potential impact on work
- PC15.** invite peers and others to observe, and provide feedback, on own performance and practices
- PC16.** use feedback from colleagues and clients to identify and introduce, improvements at work

##### *Work in a disciplined and ethical manner*

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

- PC17.** perform tasks as per workplace standard and in compliance with organisational policies and legislative requirements
- PC18.** display appropriate professional appearance for the workplace while adhering to organisational policy for dress code

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- PC19.** demonstrate responsible and disciplined behaviors in the workplace Disciplined behaviors: e.g. punctuality; completing tasks as per given time and standards; using professional behavior at all times, adopting environment- friendly practices, etc.
- PC20.** identify the cause of conflict and options for resolution when faced with situations of conflict
- PC21.** escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict
- PC22.** protect the rights of the client and organisation when delivering services
- PC23.** ensure services are delivered equally to all clients regardless of personal and cultural beliefs
- PC24.** operate within an agreed ethical code of practice
- PC25.** recognise unethical conduct and report to an appropriate person
- PC26.** follow organisational guidelines and legal requirements on disclosure and confidentiality

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** organisations policies on dress code, workplace timings, workplace behaviour, performance management, incentives, delivery standards, information security, etc.
- KU2.** organizational hierarchy and escalation matrix
- KU3.** importance of the individuals role in the workflow
- KU4.** organisational health safety and environment
- KU5.** work area inspection procedures and practices
- KU6.** importance of displaying professional appearance behaviour at all times
- KU7.** communication etiquette
- KU8.** importance of developing personal and professional goals and objectives
- KU9.** importance of identifying strengths and weaknesses in relation to goals and objectives
- KU10.** how to identify strengths and weaknesses and evaluate own capacity to meet goals and objectives
- KU11.** how to determine personal development needs
- KU12.** importance of continuous learning and developing a professional development plan
- KU13.** development opportunities to support continuous learning and maintain currency of professional practice
- KU14.** developments and trends impacting on professional practice
- KU15.** importance of taking and using feedback from colleagues and clients to identify and introduce, improvements in work performance
- KU16.** perform tasks to the required workplace standard
- KU17.** importance of discipline and ethics in a professional workplace
- KU18.** importance of recognising unethical conduct and reporting to the appropriate authority
- KU19.** guidelines and legal requirements on disclosure and confidentiality
- KU20.** importance of collaboratively with colleagues through sharing information and ideas and working together on agreed outcomes
- KU21.** how to recognise, avoid and/or address any conflict of interest

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**KU22.** how to respond to inappropriate behaviour towards self and others in a professional manner

### Generic Skills (GS)

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

- GS1.** complete forms such as work orders, invoices, maintenance records
- GS2.** fill up appropriate forms, activity logs, attendance sheets as per organizational format in English and/or local language
- GS3.** write basic accident or incident report as witnessed in an appropriate format to the relevant authority
- GS4.** read warnings, instructions and other text material on product labels, components, etc.
- GS5.** read relevant signages, warnings, labels or descriptions on equipment, etc. while carrying out work activities
- GS6.** convey and share technical information clearly using appropriate language
- GS7.** check and clarify task-related information
- GS8.** liaise with appropriate authorities using correct protocol
- GS9.** communicate with people in respectful form and manner in line with organizational protocol
- GS10.** seek clarification from immediate supervisor or responsible authority on how to secure safety at work when faced with difficult decisions
- GS11.** exercise most appropriate solutions to safety breaches at work
- GS12.** report to the supervisor and when to deal with a colleague depending on the type of concern
- GS13.** basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time
- GS14.** deliver product to next work process on time
- GS15.** improve work process
- GS16.** communicate problems appropriately to others
- GS17.** seek assistance and support from other sources to solve problems
- GS18.** follow standard operating procedures and workplace guidelines while searching for solutions to problems
- GS19.** report potential areas of disruptions to work process
- GS20.** match symptoms of the fault noticed to the cause of the problem
- GS21.** anticipate and avoid hazards that may occur during repairs because of tools, materials used or repair processes
- GS22.** spot process disruptions and delays

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### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Communicate effectively at the workplace</i>	<b>9</b>	<b>13</b>	-	-
<b>PC1.</b> exchange information and instructions with others at the workplace clearly, accurately and within agreed timelines	2	3	-	-
<b>PC2.</b> seek clarification to obtain complete information and confirm understanding while receiving communications	2	2	-	-
<b>PC3.</b> display helpful behaviour by assisting others in performing tasks where required	1	2	-	-
<b>PC4.</b> follow communication etiquette while working to convey politeness, assertiveness, care and professionalism	2	3	-	-
<b>PC5.</b> share all relevant information with stakeholders in agreed formats and as per agreed timelines	2	3	-	-
<i>Work in an effective manner</i>	<b>8</b>	<b>13</b>	-	-
<b>PC6.</b> identify and obtain clarity regarding organisational, team and own goals and targets	2	3	-	-
<b>PC7.</b> prioritise and plan work in order to achieve goals and targets	2	3	-	-
<b>PC8.</b> monitor own and team performance as per agreed plan	1	3	-	-
<b>PC9.</b> complete duties accurately, systematically and within required timeframes	1	2	-	-
<b>PC10.</b> maintain orderliness and cleanliness in the work area	2	2	-	-
<i>Maintain and enhance professional competence</i>	<b>10</b>	<b>13</b>	-	-
<b>PC11.</b> identify own strengths and weaknesses in relation to goals and targets	2	2	-	-
<b>PC12.</b> select opportunities for continuous learning and maintaining currency of professional practice	2	2	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC13.</b> develop a professional development plan to enhance professional capabilities	2	3	-	-
<b>PC14.</b> examine developments and trends in field of work and potential impact on work	2	2	-	-
<b>PC15.</b> invite peers and others to observe, and provide feedback, on own performance and practices	1	2	-	-
<b>PC16.</b> use feedback from colleagues and clients to identify and introduce, improvements at work	1	2	-	-
<i>Work in a disciplined and ethical manner</i>	<b>13</b>	<b>21</b>	-	-
<b>PC17.</b> perform tasks as per workplace standard and in compliance with organisational policies and legislative requirements	1	2	-	-
<b>PC18.</b> display appropriate professional appearance for the workplace while adhering to organisational policy for dress code	1	2	-	-
<b>PC19.</b> demonstrate responsible and disciplined behaviors in the workplace Disciplined behaviors: e.g. punctuality; completing tasks as per given time and standards; using professional behavior at all times, adopting environment- friendly practices, etc.	2	3	-	-
<b>PC20.</b> identify the cause of conflict and options for resolution when faced with situations of conflict	2	2	-	-
<b>PC21.</b> escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict	1	2	-	-
<b>PC22.</b> protect the rights of the client and organisation when delivering services	2	2	-	-
<b>PC23.</b> ensure services are delivered equally to all clients regardless of personal and cultural beliefs	1	2	-	-
<b>PC24.</b> operate within an agreed ethical code of practice	1	2	-	-
<b>PC25.</b> recognise unethical conduct and report to an appropriate person	1	2	-	-



### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC26. follow organisational guidelines and legal requirements on disclosure and confidentiality	1	2	-	-
<b>NOS Total</b>	<b>40</b>	<b>60</b>	-	-



## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ELE/N9905
<b>NOS Name</b>	Work effectively at the workplace
<b>Sector</b>	Electronics
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	6
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	27/01/2022
<b>Next Review Date</b>	02/06/2025
<b>NSQC Clearance Date</b>	27/01/2022

## 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 l
- 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

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- 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



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- 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	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<p><b>PC11.</b></p> <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 l</li> </ul>	1	3	-	-
<p><b>PC12.</b> exhibit rescue and first-aid techniques in case of fire or electrocution</p>	1	3	-	-
<p><i>Follow emergencies, rescue and first-aid procedures</i></p>	<b>6</b>	<b>13</b>	-	-
<p><b>PC13.</b> administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning etc.</p>	1	3	-	-
<p><b>PC14.</b> administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock,</p>	1	2	-	-
<p><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</p>	2	4	-	-
<p><b>PC16.</b> use correct method to move injured people and others during an emergency</p>	2	4	-	-
<p><i>Effective waste management/recycling practices</i></p>	<b>5</b>	<b>12</b>	-	-
<p><b>PC17.</b> identify recyclable and non-recyclable, and hazardous waste generated</p>	1	3	-	-
<p><b>PC18.</b> segregate waste into different categories</p>	1	2	-	-
<p><b>PC19.</b> ensure disposal of non-recyclable waste appropriately</p>	1	2	-	-
<p><b>PC20.</b> deposit non-recyclable and reusable material at identified location</p>	1	3	-	-



### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC21. 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>	03/05/2026
<b>NSQC Clearance Date</b>	03/05/2023

## Assessment Guidelines and Assessment Weightage

### Assessment Guidelines

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

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**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/N5313.Manage SMT machines	40	50	-	10	100	35
ELE/N5314.Manage production process, material quality and machines	40	50	-	10	100	35
ELE/N9905.Work effectively at the workplace	40	60	-	-	100	15
ELE/N1002.Apply health and safety practices at the workplace	35	65	-	-	100	15
<b>Total</b>	<b>155</b>	<b>225</b>	<b>-</b>	<b>20</b>	<b>400</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.

## Qualification Pack

<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.