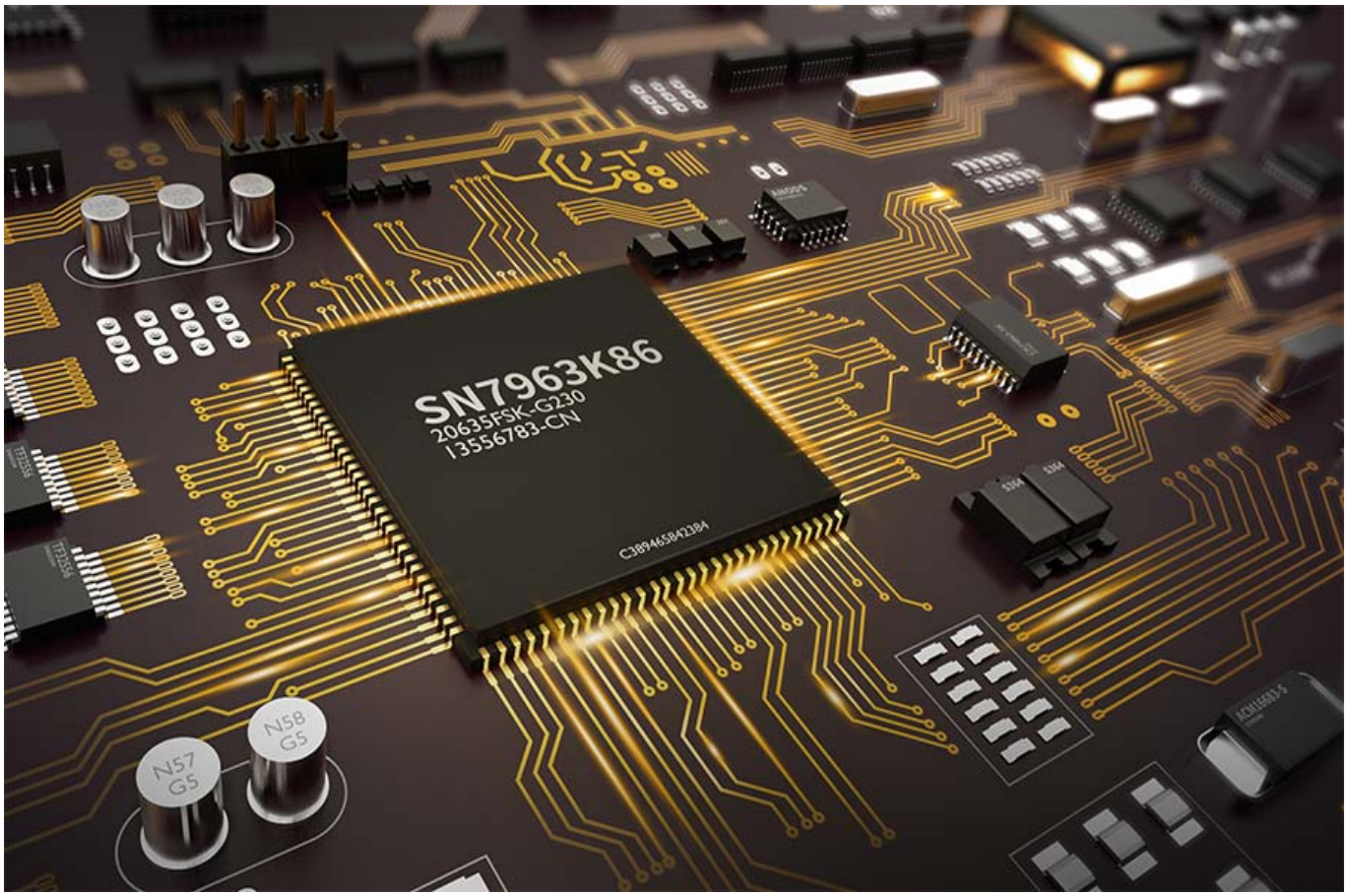
Qualification Pack



Laser Marking and Cutting - Process Engineer

QP Code: ELE/Q0118

Version: 1.0

NSQF Level: 5

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Contents

ELE/Q0118: Laser Marking and Cutting - Process Engineer

Brief Job Description

A laser marking & cutting process engineer is responsible for proper functioning, troubleshooting and maintenance of laser marking & cutting machines, set up process parameters, new recipes to be incorporated, material characterization and yield monitoring/analysis, etc. for equipment, tools and fixtures. He/she also assists the equipment engineer for any help needed with the laser marking and cutting machines operations.

Personal Attributes

The person must have an aptitude for detail along with strong analytical and problem-solving skills. The individual should have excellent verbal and written communication skills. The person must also have good organisational and coordination skills.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ELE/N0117: Recipe/Program Readiness - Define Process Parameters
2. ELE/N0118: Data Analysis & Yield, Cost & Productivity Improvement
3. ELE/N0119: Equipment Setup support
4. ELE/N0120: Machine Buy Off/Tools
5. ELE/N9905: Work effectively at the workplace
6. ELE/N1002: Apply health and safety practices at the workplace

Qualification Pack (QP) Parameters

Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
Country	India
NSQF Level	5
Credits	NA

Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification & Experience	Diploma (after 10th (Electrical or Electronics Engineering) with 3 Years of Relevant experience OR Diploma after 12th (Electrical or Electronics Engineering) with 1 Year of Relevant experience) OR B.E./B.Tech (Degree in Electrical or Electronics Engineering) OR Certificate-NSQF (Level-4 in semiconductor domain) with 2 Years of experience in the relevant field
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	20 Years
Last Reviewed On	24/02/2022
Next Review Date	24/02/2025
Deactivation Date	31/07/2024
NSQC Approval Date	24/02/2022
Version	1.0
Reference code on NQR	2022/EHW/ESSC/05396
NQR Version	1.0

ELE/N0117: Recipe/Program Readiness - Define Process Parameters

Description

The OS unit is about define and verify process parameters for the prepare for SOP and Travelling card

Scope

The scope covers the following :

- Define Process Parameters
- Verify Process Parameters
- Prepare SOP and Travelling Card
- Manage Daily Activity

Elements and Performance Criteria

Define Process Parameters

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

PC1. understand the strip dimensions and internal structure

PC2. define package outline drawing and strip drawing (PIN Holes, Fiducial Marks and Orientation)

PC3. describe the laser type, Laser Speed, Engraving thickness and Engraving orientation

PC4. define marking content, marking depth, width and visibility

PC5. run dummy samples

PC6. ensure that proper measurement of laser depth, marking content size & visibility check is done

PC7. perform repetitive tests till the specified criteria is met

PC8. generate the recipe with best optimized parameters and save it

PC9. input major parameters into Travelling card and SOP both

PC10. prepare full SOP and release to production

PC11. highlight if any special requirement is needed

Verify Process Parameters

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

PC12. copy old recipe of similar program

PC13. make changes as per product and customer requirement

PC14. run dummies do all measurements, Calculate CPK, PPK & other quality parameters

PC15. save the program after all parameters have been verified

PC16. run real product & do all measurements

PC17. conduct inspection for visibility, void and wire exposure and prepare for mass production

Prepare SOP and Travelling Card

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

PC18. assess proper features required for working with AUTO CAD

PC19. prepare process flow with clear specifications like Temperature, Speed, Water Flow, Vacuum etc.

PC20. prepare SOP in such a way so that it is more understandable to operators with pictures, visuals, data Charts etc.

PC21. train operators on SOP Flow

PC22. prepare travelling card with defined process or program name/ code

Manage Daily Activity

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

PC23. ensure all travelling cards release to production are ok

PC24. conduct regular inspection of programs as well as lot data such as yield, failure etc.

PC25. ensure that the machine and equipment is ready for any emergency situation

PC26. prepare daily activity plan

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance of determining the strip dimensions and internal structure for laser marking and cutting

KU2. the process of defining the package outline drawing and strip drawing, i.e. PIN Holes, Fiducial Marks and Orientation

KU3. the laser type, laser speed, engraving thickness and engraving orientation

KU4. the marking content, marking depth, width and visibility

KU5. the process of running dummy samples

KU6. the importance of ensuring the appropriate measurement of laser depth, marking content size and conducting visibility check

KU7. the importance of performing repetitive tests until the specified criteria is met

KU8. the process of generating the recipe with the best-optimized parameters and saving it

KU9. the importance of inputting the major parameters into the travelling card and SOP

KU10. the process of preparing full SOP and releasing it to production

KU11. the importance of highlighting if any special requirement

KU12. the benefit of copying the old recipe of a similar program

KU13. the importance and process of making appropriate changes as per the product and customer requirement

KU14. the process of running dummies, taking appropriate measurements, calculating CPK, PPK and other quality parameters

KU15. the importance of saving the program after verifying all the parameters

KU16. the process of running real product and taking all measurements

KU17. the importance and process of conducting an inspection for visibility, void and wire exposure and preparing for mass production

KU18. the process of assessing the proper features required for working with AUTO CAD

KU19. the process of preparing process flow with clear specifications, such as temperature, speed, water flow, vacuum etc.

KU20. the importance and process of preparing SOP so that it is more understandable to operators with pictures, visuals, data charts etc.

KU21. the importance of training operators on SOP Flow

KU22. the process of preparing a travelling card with the defined process or program name/ code

KU23. the importance of ensuring all the travelling cards to be released to production meet the applicable quality standards

KU24. the importance of conducting regular inspection of programs and lot data such as yield, failure etc.

KU25. the importance of ensuring the machine and equipment is ready for any emergencies

KU26. the importance and process of preparing a daily activity plan

Generic Skills (GS)

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

GS1. write work-related notes and maintain relevant records

GS2. read the relevant literature to get the latest updates about the field of work

GS3. listen attentively to understand the information/ instructions being shared by the speaker

GS4. communicate politely and professionally

GS5. plan and prioritise tasks to ensure timely completion

GS6. evaluate all possible solutions to a problem to select the best one

GS7. co-ordinate with the co-workers to achieve work objectives

GS8. identify possible disruptions to work and take appropriate preventive measures

GS9. take quick decisions to deal with workplace emergencies/ accidents

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Define Process Parameters	**14**	**23**	**-**	**-**
PC1. understand the strip dimensions and internal structure	2	3	-	-
PC2. define package outline drawing and strip drawing (PIN Holes, Fiducial Marks and Orientation)	1	2	-	-
PC3. describe the laser type, Laser Speed, Engraving thickness and Engraving orientation	1	3	-	-
PC4. define marking content, marking depth, width and visibility	1	2	-	-
PC5. run dummy samples	2	2	-	-
PC6. ensure that proper measurement of laser depth, marking content size & visibility check is done	1	3	-	-
PC7. perform repetitive tests till the specified criteria is met	1	1	-	-
PC8. generate the recipe with best optimized parameters and save it	1	2	-	-
PC9. input major parameters into Travelling card and SOP both	1	1	-	-
PC10. prepare full SOP and release to production	1	2	-	-
PC11. highlight if any special requirement is needed	2	2	-	-
Verify Process Parameters	**9**	**15**	**-**	**-**
PC12. copy old recipe of similar program	2	3	-	-
PC13. make changes as per product and customer requirement	1	2	-	-
PC14. run dummies do all measurements, Calculate CPK, PPK & other quality parameters	2	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. save the program after all parameters have been verified	1	2	-	-
PC16. run real product & do all measurements	1	3	-	-
PC17. conduct inspection for visibility, void and wire exposure and prepare for mass production	2	2	-	-
Prepare SOP and Travelling Card	**7**	**13**	**-**	**-**
PC18. assess proper features required for working with AUTO CAD	1	4	-	-
PC19. prepare process flow with clear specifications like Temperature, Speed, Water Flow, Vacuum etc.	2	2	-	-
PC20. prepare SOP in such a way so that it is more understandable to operators with pictures, visuals, data Charts etc.	1	3	-	-
PC21. train operators on SOP Flow	1	2	-	-
PC22. prepare travelling card with defined process or program name/ code	2	2	-	-
Manage Daily Activity	**10**	**9**	**-**	**-**
PC23. ensure all travelling cards release to production are ok	2	1	-	-
PC24. conduct regular inspection of programs as well as lot data such as yield, failure etc.	3	2	-	-
PC25. ensure that the machine and equipment is ready for any emergency situation	3	4	-	-
PC26. prepare daily activity plan	2	2	-	-
NOS Total	**40**	**60**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0117
NOS Name	Recipe/Program Readiness - Define Process Parameters
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	24/02/2022
Next Review Date	24/02/2025
NSQC Clearance Date	24/02/2022

ELE/N0118: Data Analysis & Yield, Cost & Productivity Improvement

Description

This OS unit is about making appropriate cost and productivity improvements

Scope

The scope covers the following :

- Analyse Data and Yield
- Advise Cost and Productivity Improvements

Elements and Performance Criteria

Analyse Data and Yield

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

PC1. understand & prepare data for the strip dimensions and internal structure

PC2. collect data from drawings and other specification documents

PC3. record data related to marking content, marking depth, width and visibility

PC4. record measurement details as per formats for laser depth, marking content size & visibility check

PC5. ensure that the recipe is optimal as per the business case and user parameters

PC6. ensure that the SOP and production plan are optimal in terms of parameters and yield

Advise Cost and Productivity Improvements

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

PC7. ensure that proper market analysis has been conducted for new products, process parameters has been properly verified

PC8. reuse older program versions to make them better and improved as per current scenario and requirements

PC9. ensure cost and time are kept in mind while making changes as per product and customer requirements

PC10. calculate CPK, PPK and other quality parameters to anlayse and suggest productivity improvements

PC11. perform inspection of equipment and machines to ensure they are working for optimal productivity

PC12. analyse any additional maintenance cost and prepare a budget for the same

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the process of preparing data for the strip dimensions and internal structure

KU2. how to collate data from drawings and other specification documents

KU3. the importance of recording the data related to marking content, marking depth, width and visibility

KU4. the importance of recording the measurement details as per formats for laser depth, marking content size and visibility check

KU5. the importance of ensuring that the recipe is optimal as per the business case and user parameters

KU6. the importance of ensuring that the SOP and production plan are optimal in terms of parameters and yield

KU7. the importance of conducting proper market analysis for new products, and verifying the process parameters

KU8. the benefits of reusing old program versions and improving them as per the current scenario and requirements

KU9. the importance of considering time and cost while making changes as per time product and customer requirements

KU10. the importance and process of calculating CPK, PPK and other quality parameters to analyse and suggest appropriate productivity improvements

KU11. the importance and process of performing inspection of equipment and machines to ensure they are working optimally

KU12. the process of analysing additional maintenance costs and preparing a budget for the same

Generic Skills (GS)

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

GS1. maintain the record of work-related observations

GS2. read the relevant literature to get the latest updates about the field of work

GS3. communicate politely and professionally

GS4. listen attentively to understand the information or instructions being given

GS5. co-ordinate with the co-workers to achieve the work objectives

GS6. plan and schedule tasks to achieve work efficiency

GS7. identify possible disruptions to work and take preventive measures

GS8. evaluate all possible solutions to a problem to select the best one

GS9. take quick decisions to deal with workplace emergencies or accidents

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Analyse Data and Yield	**23**	**29**	**-**	**-**
PC1. understand & prepare data for the strip dimensions and internal structure	5	4	-	-
PC2. collect data from drawings and other specification documents	6	5	-	-
PC3. record data related to marking content, marking depth, width and visibility	4	6	-	-
PC4. record measurement details as per formats for laser depth, marking content size & visibility check	3	5	-	-
PC5. ensure that the recipe is optimal as per the business case and user parameters	2	4	-	-
PC6. ensure that the SOP and production plan are optimal in terms of parameters and yield	3	5	-	-
Advise Cost and Productivity Improvements	**17**	**31**	**-**	**-**
PC7. ensure that proper market analysis has been conducted for new products, process parameters has been properly verified	3	5	-	-
PC8. reuse older program versions to make them better and improved as per current scenario and requirements	2	6	-	-
PC9. ensure cost and time are kept in mind while making changes as per product and customer requirements	2	4	-	-
PC10. calculate CPK, PPK and other quality parameters to anlayse and suggest productivity improvements	4	5	-	-
PC11. perform inspection of equipment and machines to ensure they are working for optimal productivity	3	5	-	-
PC12. analyse any additional maintenance cost and prepare a budget for the same	3	6	-	-
NOS Total	**40**	**60**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0118
NOS Name	Data Analysis & Yield, Cost & Productivity Improvement
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	24/02/2022
Next Review Date	24/02/2025
NSQC Clearance Date	24/02/2022

ELE/N0119: Equipment Setup support

Description

The OS unit is about equipment setup support

Scope

The scope covers the following :

- Support Loader/Unloader & Rail setup
- Material Handeling procedure
- Support Laser Setup
- Support change over

Elements and Performance Criteria

Support Loader/Unloader & Rail setup

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

PC1. define magazine loading parameter

PC2. list the strip pickup criteria and specify the orientation of strip

PC3. ensure that the placement location is properly marked

PC4. outline the rail moving speed and laser height for marking

PC5. define strip unloading parameters and strip unloading direction/Orientation with location inside the magazine

PC6. list the handling steps of magazine and strips during marking

Material Handeling procedure

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

PC7. outline the instructions to handle/hold the magazine

PC8. list the specifications to place the magazine inside the loader

PC9. advise the operator to avoid ESD and other mishappening issues

PC10. ensure that all operators understand alarms and mention if its false or not

PC11. guide the operators how to wear fingure tips

PC12. advise the operators to process lot or material inside the machine

PC13. supervise the operators for collecting the data and make the data log sheet for each lot

Support Laser Setup

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

PC14. define the laser head criteria

PC15. identify strip location and orientation for correct marking as well as laser height and angle

PC16. define laser power and moving speed

PC17. save all parameters

PC18. check all marking parameters whether they are ok or not

Support Change Over

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

PC19. make different recipes for different products
PC20. save these recipes as per the well-defined naming rule
PC21. guide operators to change the recipe as per product
PC22. verify all the parameters on samples based
PC23. run original product after verifying all parameters
PC24. keep the records of all abnormalities (False Alarm, stoppage, mis-marking etc.) that happened throughout the day

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance and process of defining the magazine loading parameter
KU2. the strip pickup criteria and the orientation of strip
KU3. the importance of ensuring that the placement location is appropriately marked
KU4. how to outline the rail moving speed and laser height for marking
KU5. the importance and process of defining strip unloading parameters and strip unloading direction/orientation with a location inside the magazine
KU6. the steps for handling steps magazine and strips during marking
KU7. the instructions for handling/holding the magazine
KU8. the specifications to place the magazine inside the loader
KU9. the use of appropriate PPE and the precautions to be followed to avoid ESD and any miss-happening
KU10. the importance of ensuring all operators understand different types of alarms, including false alarms
KU11. the importance of ensuring supervising operators
KU12. the relevant data to be collected to prepare the appropriate data log sheets for each lot
KU13. how to define the laser head criteria
KU14. the importance of identifying strip location and orientation for correct marking, and laser height and angle
KU15. the importance of defining laser power and moving speed
KU16. the importance of checking all marking parameters to ensure they meet the applicable standards
KU17. the importance of making different recipes for different products and saving them as per the defined naming rules
KU18. the importance of verifying all the parameters and running the original product
KU19. the importance of maintaining daily records for any abnormalities, e.g. false alarm, stoppage, miss-marking etc.

Generic Skills (GS)

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

GS1. read the relevant literature to get the latest updates about the field of work

GS2. communicate politely and professionally
GS3. write work-related notes
GS4. take quick decisions to deal with any disruptions to work
GS5. co-ordinate with co-workers to achieve the work objectives
GS6. identify possible disruptions to work and take appropriate preventive measures
GS7. evaluate all possible solutions to a problem to select the best one

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Support Loader/Unloader & Rail setup	**10**	**20**	**-**	**-**
PC1. define magazine loading parameter	2	3	-	-
PC2. list the strip pickup criteria and specify the orientation of strip	2	4	-	-
PC3. ensure that the placement location is properly marked	1	3	-	-
PC4. outline the rail moving speed and laser height for marking	2	3	-	-
PC5. define strip unloading parameters and strip unloading direction/Orientation with location inside the magazine	1	4	-	-
PC6. list the handling steps of magazine and strips during marking	2	3	-	-
Material Handeling procedure	**12**	**20**	**-**	**-**
PC7. outline the instructions to handle/hold the magazine	3	4	-	-
PC8. list the specifications to place the magazine inside the loader	2	3	-	-
PC9. advise the operator to avoid ESD and other mishappening issues	1	4	-	-
PC10. ensure that all operators understand alarms and mention if its false or not	2	3	-	-
PC11. guide the operators how to wear fingure tips	1	1	-	-
PC12. advise the operators to process lot or material inside the machine	2	2	-	-
PC13. supervise the operators for collecting the data and make the data log sheet for each lot	1	3	-	-
Support Laser Setup	**6**	**12**	**-**	**-**
PC14. define the laser head criteria	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. identify strip location and orientation for correct marking as well as laser height and angle	1	2	-	-
PC16. define laser power and moving speed	1	3	-	-
PC17. save all parameters	1	2	-	-
PC18. check all marking parameters whether they are ok or not	2	2	-	-
Support Change Over	**12**	**8**	**-**	**-**
PC19. make different recipes for different products	2	1	-	-
PC20. save these recipes as per the well-defined naming rule	2	1	-	-
PC21. guide operators to change the recipe as per product	2	1	-	-
PC22. verify all the parameters on samples based	2	2	-	-
PC23. run original product after verifying all parameters	2	2	-	-
PC24. keep the records of all abnormalities (False Alarm, stoppage, mis-marking etc.) that happened throughout the day	2	1	-	-
NOS Total	**40**	**60**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0119
NOS Name	Equipment Setup support
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	24/02/2022
Next Review Date	24/02/2025
NSQC Clearance Date	24/02/2022

ELE/N0120: Machine Buy Off/Tools

Description

The OS unit is about selection and buying process for the laser machines.

Scope

The scope covers the following :

- Factory Acceptance Test at Equipment manufacturer site
- Site acceptance test at product manufacturer site
- Laser Type selection and Qualification

Elements and Performance Criteria

Factory Acceptance Test at Equipment manufacturer site

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

PC1. create a FAT Report

PC2. ensure that the general machine specifications (operation, main controller, main panel should function as per requirements given to manufacturer)

PC3. check that laser specification, dimensions and other parameters are clearly defined by the process and equipment engineer

PC4. verify all equipment and process parameters during testing at site

PC5. outline the sample size required to buy off machines as per specification and CPK requirements

PC6. run all the material through equipment along with manufacturers team

PC7. prepare a report to avoid any future issues

PC8. record all observations and findings

Site acceptance test at product manufacturer site

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

PC9. create a SAT Report

PC10. ensure that all general machine specification (operation, main controller, main panel should function as per requirements given to manufacturer) are considered in the SAT report

PC11. check all equipment and process parameters to ensure that they DMAT during testing at site

PC12. outline the sample size required to buy off machines as per the specification and CPK Requirements

PC13. run all the tests through managers and manufacturers team

Laser Type selection and Qualification

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

PC14. seek the laser type based on molding compound

PC15. design the DOE to verify laser type

PC16. collect all the quality and reliability data for each characterization, feasibility and qualification build

PC17. generate PCN (Process Change Notification) and inform the customer

PC18. prepare qualification report and present it to the management

PC19. release to LVM (Low volume Mass Production) and coordinate with production team to make smooth transition to high volume mass production

PC20. ensure that characterization phase, feasibility phase, customer samples phase and qualification phase is considered

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance and process of creating a Factory Acceptance Test (FAT) Report

KU2. the importance of ensuring that the main controller and main panel function as per the requirements given to the manufacturer, along with general machine specifications and operations

KU3. the importance of checking the laser specifications, dimensions and other parameters are clearly defined by the process and equipment engineer

KU4. the importance of verifying all equipment and process parameters during testing at the site

KU5. the importance of outlining the sample size required to buy off machines as per the specifications and CPK requirements

KU6. the importance and process of running all the material through equipment along with the manufacturing team

KU7. the importance of preparing a report, recording all observations and findings to avoid any future issues

KU8. the process of creating a Site Acceptance Test (SAT) Report

KU9. the importance of ensuring the main controller and main panel function as per the requirements given to the manufacturer

KU10. the importance of checking all equipment and process parameters to ensure that they DMAT during testing at the site

KU11. the importance of outlining the sample size required to buy off machines as per the specification and CPK Requirements

KU12. the importance of running the tests through managers and manufacturers team

KU13. the importance of seeking the laser type based on the molding compound

KU14. the process of designing the DOE to verify laser type

KU15. the importance of collecting the quality and reliability data for each characterization, feasibility and qualification build

KU16. the process of generating Process Change Notification (PCN)

KU17. the process of preparing the qualification report

KU18. the transition from low volume mass production to high volume mass production

KU19. the importance of considering the characterization phase, feasibility phase, customer samples phase and qualification phase

Generic Skills (GS)

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

GS1. maintain work-related notes and records
GS2. read the relevant literature to get the latest updates about the field of work
GS3. listen attentively to understand the information/ instructions being shared
GS4. communicate politely and professionally
GS5. plan and prioritise tasks to ensure timely completion
GS6. co-ordinate with the co-workers to achieve the work objectives
GS7. evaluate all possible solutions to a problem to select the best one
GS8. take quick decisions to deal with workplace emergencies/ accidents

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Factory Acceptance Test at Equipment manufacturer site	**19**	**33**	**-**	**-**
PC1. create a FAT Report	2	3	-	-
PC2. ensure that the general machine specifications (operation, main controller, main panel should function as per requirements given to manufacturer)	2	4	-	-
PC3. check that laser specification, dimensions and other parameters are clearly defined by the process and equipment engineer	3	5	-	-
PC4. verify all equipment and process parameters during testing at site	2	4	-	-
PC5. outline the sample size required to buy off machines as per specification and CPK requirements	2	3	-	-
PC6. run all the material through equipment along with manufacturers team	3	5	-	-
PC7. prepare a report to avoid any future issues	2	4	-	-
PC8. record all observations and findings	3	5	-	-
Site acceptance test at product manufacturer site	**11**	**16**	**-**	**-**
PC9. create a SAT Report	2	4	-	-
PC10. ensure that all general machine specification (operation, main controller, main panel should function as per requirements given to manufacturer) are considered in the SAT report	2	3	-	-
PC11. check all equipment and process parameters to ensure that they DMAT during testing at site	2	4	-	-
PC12. outline the sample size required to buy off machines as per the specification and CPK Requirements	3	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. run all the tests through managers and manufacturers team	2	2	-	-
Laser Type selection and Qualification	**10**	**11**	**-**	**-**
PC14. seek the laser type based on molding compound	1	2	-	-
PC15. design the DOE to verify laser type	1	2	-	-
PC16. collect all the quality and reliability data for each characterization, feasibility and qualification build	1	2	-	-
PC17. generate PCN (Process Change Notification) and inform the customer	2	1	-	-
PC18. prepare qualification report and present it to the management	2	2	-	-
PC19. release to LVM (Low volume Mass Production) and coordinate with production team to make smooth transition to high volume mass production	2	1	-	-
PC20. ensure that characterization phase, feasibility phase, customer samples phase and qualification phase is considered	1	1	-	-
NOS Total	**40**	**60**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0120
NOS Name	Machine Buy Off/Tools
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	24/02/2022
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NSQC Clearance Date	24/02/2022

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.

Scope

The scope covers the following :

- Communicate effectively at the workplace
- Work effectively
- Maintain and enhance professional competence
- Work in a disciplined and ethical manner
- Uphold social diversity at the workplace

Elements and Performance Criteria

Communicate effectively at the workplace

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

PC1. exchange information and instruction with colleagues, and seek clarifications and feedback as necessary

PC2. assist colleagues where required

PC3. follow business communication etiquette in all interactions and communicative formats (online, digital, and in-person)

PC4. document and share all relevant information with stakeholders in agreed formats and as per agreed timelines

Work effectively

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

PC5. identify and obtain clarity regarding organisational, team and own goals and targets

PC6. prioritise and plan work in order to achieve goals and targets

PC7. monitor own and team performance as per agreed plan

PC8. complete duties accurately, systematically and within required timeframes

PC9. express emotions appropriately at the workplace and manage own response to heightened emotions

PC10. maintain orderliness and cleanliness in the work area

Maintain and enhance professional competence

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. adapt self, service, or product to meet success criteria

PC13. seek and select opportunities for continuous professional development

PC14. formulate a professional development plan to enhance capabilities

PC15. build or contribute to the organizational knowledge base of cases, clients, issues, solutions, and innovations

PC16. examine developments and trends in field of work and their potential impact on work

PC17. take feedback from peers, supervisors and clients to improve own performance and practices

Work in a disciplined and ethical manner

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

PC18. perform tasks as per workplace standards, organisational policies and legislative requirements

PC19. display appropriate professional appearance at the workplace and adhere to the organisational dress code

PC20. demonstrate responsible and disciplined behaviour at the workplace such as punctuality; completing tasks as per given time and standards; demonstrating professional behaviour at all times, adopting environment- friendly practices, etc.

PC21. identify the cause of conflict and options for resolution with peers or escalate grievances and problems to appropriate authority as per procedure for conflict resolution

PC22. protect the rights of the client and 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 and report unethical conduct to the appropriate authorities

PC25. follow organisational guidelines and legal requirements on disclosure and confidentiality

Uphold social diversity at the workplace

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

PC26. recognize and evaluate biased practices against underrepresented groups like women and persons with disabilities, in workplace systems and processes

PC27. identify and report discrimination and harassment based on gender, disability, or cultural difference at the workplace

PC28. use inclusive or neutral language and gestures in all interactions

PC29. respect the personal and professional space of others

PC30. access grievance redressal mechanisms as per legislations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organisation's 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 individual's role in the workflow

KU4. organisational norms on health, safety and sustainability

KU5. work area inspection procedures and practices

KU6. professional etiquette and grooming

KU7. communication etiquette across communicative mediums (online, digital, and in-person) including strategies/methods for sharing information, documentation, and providing and receiving feedback

KU8. importance of self-evaluations and developing a continuous learning and professional development plan

KU9. developments and trends impacting professional practice

KU10. importance of taking and using feedback from colleagues and clients to identify and introduce improvements in work performance

KU11. professional ethics and workplace norms on reporting and/or penalizing unethical behaviour and practices.

KU12. guidelines and legal requirements on disclosure, confidentiality, and conflicts of interest

KU13. strategies for collaboration with colleagues and clients.

KU14. professional responses and strategies against inappropriate language or behaviour toward self and others

KU15. Implicit bias (based on gender, disability, class, caste, colour, race, culture, religion, etc.) and its consequences in the workplace

KU16. organizational guidelines, prevalent legislations and accessibility norms and processes to support PwDs at the workplace

KU17. strategies for time, effort and resource allocation towards the goals.

KU18. basic concepts of work productivity including waste reduction, efficient material usage and optimization of time

Generic Skills (GS)

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

GS1. complete documentation and forms such as work orders, invoices maintenance records activity logs, attendance sheets as per organizational format in English and/or local language

GS2. write basic accident or incident report accurately in an appropriate format

GS3. read warnings, instructions and other text material on product labels, components, etc. and relevant signages, warnings, labels or descriptions on equipment, etc. while carrying out work activities

GS4. convey and share technical information clearly using appropriate language

GS5. clarify task-related information

GS6. liaise with authorities and supervisors as per organizational protocol

GS7. listen, speak, and write in an inclusive, respectful manner in line with organizational protocol

GS8. seek clarification from immediate supervisor or responsible authority or exercise most appropriate solutions to safety breaches at work

GS9. report to the supervisor and when to deal with a colleague depending on the type of concern

GS10. deliver product to next work process on time

GS11. improve work process and report potential areas of delays and disruptions

GS12. communicate problems appropriately to others

GS13. identify symptoms of the fault to the cause of the problem and resolve, otherwise seek assistance and support from other sources to solve the problem

GS14. anticipate and avoid hazards that may occur during repairs because of tools, materials used or repair processes

GS15. complete tasks efficiently and accurately within stipulated time

GS16. appreciate and respect social diversity in all professional settings

GS17. develop awareness and accountability for perspectives on gender, disabilities, and socio-cultural issues leading to discrimination, bias, or harassment at the workplace

GS18. maintain positive and effective relationships with colleagues and customers

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Communicate effectively at the workplace	**5**	**13**	**-**	**-**
PC1. exchange information and instruction with colleagues, and seek clarifications and feedback as necessary	1	3	-	-
PC2. assist colleagues where required	1	3	-	-
PC3. follow business communication etiquette in all interactions and communicative formats (online, digital, and in-person)	1	4	-	-
PC4. document and share all relevant information with stakeholders in agreed formats and as per agreed timelines	2	3	-	-
Work effectively	**6**	**13**	**-**	**-**
PC5. identify and obtain clarity regarding organisational, team and own goals and targets	1	2	-	-
PC6. prioritise and plan work in order to achieve goals and targets	1	2	-	-
PC7. monitor own and team performance as per agreed plan	1	2	-	-
PC8. complete duties accurately, systematically and within required timeframes	1	2	-	-
PC9. express emotions appropriately at the workplace and manage own response to heightened emotions	1	2	-	-
PC10. maintain orderliness and cleanliness in the work area	1	3	-	-
Maintain and enhance professional competence	**8**	**7**	**-**	**-**
PC11. identify own strengths and weaknesses in relation to goals and targets	1	1	-	-
PC12. adapt self, service, or product to meet success criteria	1	1	-	-
PC13. seek and select opportunities for continuous professional development	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. formulate a professional development plan to enhance capabilities	2	1	-	-
PC15. build or contribute to the organizational knowledge base of cases, clients, issues, solutions, and innovations	1	1	-	-
PC16. examine developments and trends in field of work and their potential impact on work	1	1	-	-
PC17. take feedback from peers, supervisors and clients to improve own performance and practices	1	1	-	-
Work in a disciplined and ethical manner	**11**	**16**	**-**	**-**
PC18. perform tasks as per workplace standards, organisational policies and legislative requirements	2	2	-	-
PC19. display appropriate professional appearance at the workplace and adhere to the organisational dress code	1	2	-	-
PC20. demonstrate responsible and disciplined behaviour at the workplace such as punctuality; completing tasks as per given time and standards; demonstrating professional behaviour at all times, adopting environment- friendly practices, etc.	1	2	-	-
PC21. identify the cause of conflict and options for resolution with peers or escalate grievances and problems to appropriate authority as per procedure for conflict resolution	2	2	-	-
PC22. protect the rights of the client and organisation when delivering services	1	2	-	-
PC23. ensure services are delivered equally to all clients regardless of personal and cultural beliefs	1	2	-	-
PC24. operate within an agreed ethical code of practice and report unethical conduct to the appropriate authorities	2	2	-	-
PC25. follow organisational guidelines and legal requirements on disclosure and confidentiality	1	2	-	-
Uphold social diversity at the workplace	**10**	**11**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC26. recognize and evaluate biased practices against underrepresented groups like women and persons with disabilities, in workplace systems and processes	2	2	-	-
PC27. identify and report discrimination and harassment based on gender, disability, or cultural difference at the workplace	2	2	-	-
PC28. use inclusive or neutral language and gestures in all interactions	2	2	-	-
PC29. respect the personal and professional space of others	2	2	-	-
PC30. access grievance redressal mechanisms as per legislations	2	3	-	-
NOS Total	**40**	**60**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N9905
NOS Name	Work effectively at the workplace
Sector	Electronics
Sub-Sector	Generic
Occupation	Generic - Organizational Behaviour
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	24/02/2022
Next Review Date	30/12/2026
NSQC Clearance Date	30/12/2021

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

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

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, CO2, 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 handing 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
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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Deal with workplace hazards	**20**	**31**	**-**	**-**
PC1. identify job-site hazards and possible causes of accident in the workplace	2	3	-	-
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.	3	4	-	-
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	3	4	-	-
PC4. follow standard safety procedures while handling tool/ ,equipment, hazardous substances and while working in hazardous environments	3	4	-	-
PC5. 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	-	-
PC6. avoid damage of components due to negligence in electrostatic discharge (ESD) procedures	2	3	-	-
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)	2	3	-	-
PC8. maintain appropriate posture while handling heavy objects	1	3	-	-
PC9. apply good housekeeping practices at all times	2	3	-	-
Apply fire safety practices	**4**	**9**	**-**	**-**
PC10. take preventive measures to prevent fire hazards	2	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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	1	3	-	-
PC12. exhibit rescue and first-aid techniques in case of fire or electrocution	1	3	-	-
Follow emergencies, rescue and first-aid procedures	**6**	**13**	**-**	**-**
PC13. administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning etc.	1	3	-	-
PC14. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock,	1	2	-	-
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	2	4	-	-
PC16. use correct method to move injured people and others during an emergency	2	4	-	-
Effective waste management/recycling practices	**5**	**12**	**-**	**-**
PC17. identify recyclable and non-recyclable, and hazardous waste generated	1	3	-	-
PC18. segregate waste into different categories	1	2	-	-
PC19. ensure disposal of non-recyclable waste appropriately	1	2	-	-
PC20. deposit non-recyclable and reusable material at identified location	1	3	-	-
PC21. follow processes specified for disposal of hazardous waste	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	**35**	**65**	**-**	**-**

National Occupational Standards (NOS) Parameters

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

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

Minimum 70% marks are required

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/N0117.Recipe/Program Readiness - Define Process Parameters	40	60	-	-	100	20
ELE/N0118.Data Analysis & Yield, Cost & Productivity Improvement	40	60	-	-	100	20
ELE/N0119.Equipment Setup support	40	60	-	-	100	20
ELE/N0120.Machine Buy Off/Tools	40	60	-	-	100	20
ELE/N9905.Work effectively at the workplace	40	60	-	-	100	10
ELE/N1002.Apply health and safety practices at the workplace	35	65	-	-	100	10
Total	**235**	**365**	**-**	**-**	**600**	**100**

Acronyms

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

Glossary

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

Organisational Context	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.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	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.
Electives	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.
Options	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.