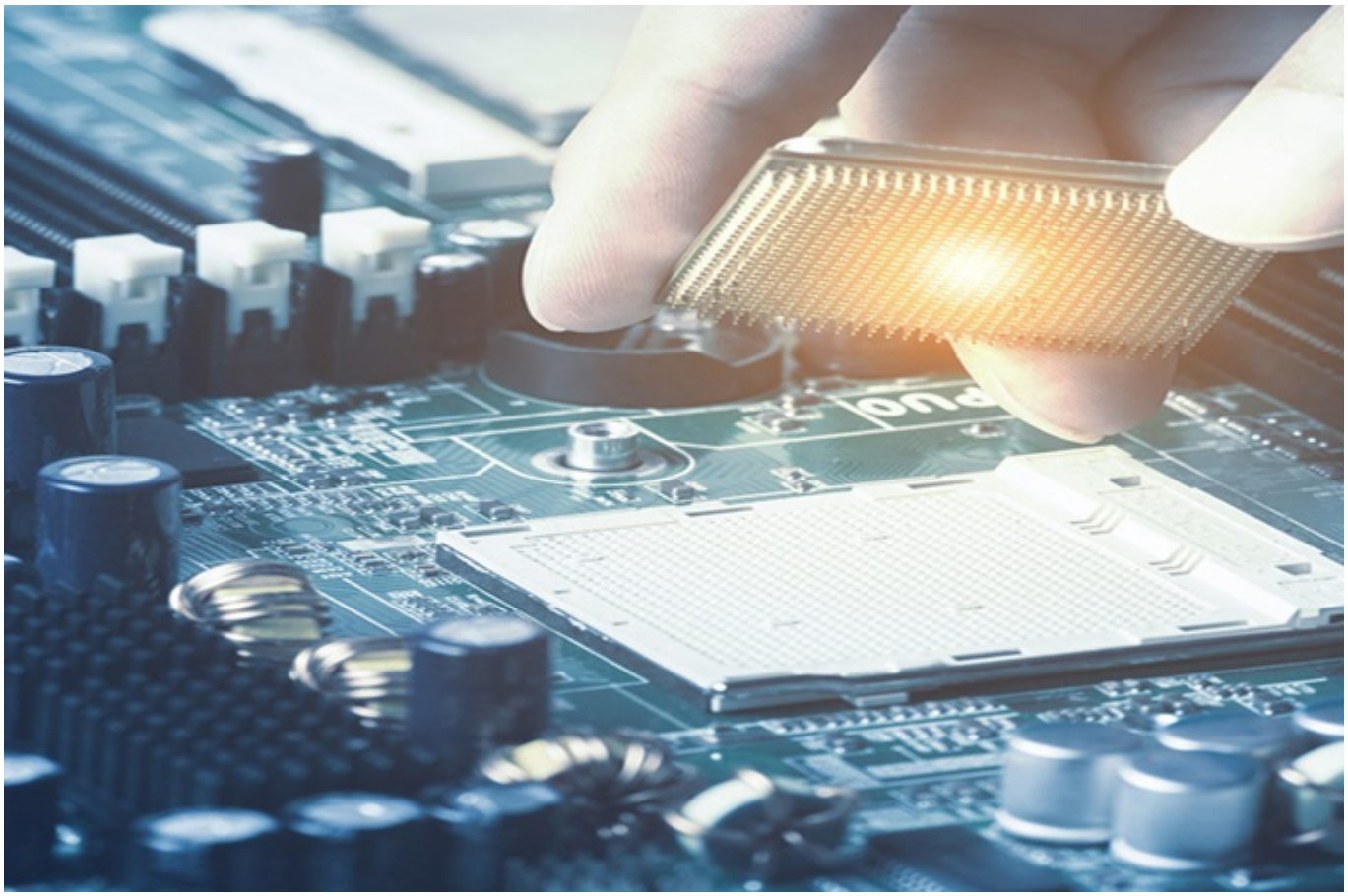
Qualification Pack



Risk and Failure Analysis Engineer (Semiconductor)

QP Code: ELE/Q0121

Version: 3.0

NSQF Level: 5

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House Okhla Industrial Area-Phase 3
New Delhi- 110020 || email:anu@essc-india.org

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ELE/Q0121: Risk and Failure Analysis Engineer (Semiconductor)

Brief Job Description

A Risk and Failure Analysis Engineer (Semiconductor) is responsible to prepare failure analysis flow & to rectify the failures. The individual is also responsible for verification and resolution by working together with several cross-functional teams for reliability flow, test requirements as per JEDEC standards.

Personal Attributes

The individual must have an aptitude for details along with analytical and problem-solving skills. The person should be able to work in co-ordination with others. The individual should be able to communicate appropriately, both verbally and in writing.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ELE/N0160: Operate chemical-related process
2. ELE/N0161: Operate optical microscope and X-Ray Machine
3. ELE/N0162: Operate Scanning Electron Microscope (SEM), Confocal Scanning Electron Microscopy (CSEM) & Focused Ion Beam (FIB)
4. ELE/N0163: Understanding of full failure Analysis flow
5. ELE/N0164: Report Preparation & guidance to the Process Engineer
6. ELE/N0165: Reliability Flow & Testing
7. DGT/VSQ/N0102: Employability Skills (60 Hours)

Qualification Pack (QP) Parameters

Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Quality Assurance
Country	India
NSQF Level	5

Credits	19
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7543.0803
Minimum Educational Qualification & Experience	Completed 2nd year of UG (UG Diploma) (Physics/ Electronics /Electrical/Mechanical) with 1.5 years of experience Relevant Experience in Semiconductor & Components OR Completed 3 year diploma after 10th (Electronics/Electrical/Mechanical) with 3 Years of experience Relevant Experience in Semiconductor & Components OR Previous relevant Qualification of NSQF Level (4.5) with 1.5 years of experience Relevant Experience in Semiconductor & Components
Minimum Level of Education for Training in School	10th Class
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	31/10/2025
NSQC Approval Date	08/05/2025
Version	3.0
Reference code on NQR	QG-05-EH-03990-2025-V3-ESSCI
NQR Version	3.0

Remarks:

NA

ELE/N0160: Operate chemical-related process

Description

The NOS unit is about operating chemical-related process.

Scope

The scope covers the following :

- X Section
- De-Cap
- Solder Mask Removal

Elements and Performance Criteria

X Section

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

PC1. understand the polishing machine
PC2. operate the polishing machine
PC3. verify the X Section procedure
PC4. verify the Chemical Slurry usage procedure
PC5. check Grinding Paper
PC6. determine the difference between dry and wet polish

De-Cap

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

PC7. operate the procedure of Manual De-Cap
PC8. operate the Laser De-Cap Machine
PC9. understand the chemical composition and create the recipe
PC10. verify document and guide operators for recipe use
PC11. check the procedure for Multi-Die De-Cap
PC12. monitor the procedure to avoid any mishappening (How to use Chemicals)

Solder Mask Removal

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

PC13. identify the chemical composition and temperature to remove the solder mask
PC14. ensure to generate recipes and usages flow documents
PC15. manage to guide the operator to use recipes

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. how to identify the die dimensions and back grinding processes

KU2. the importance of analyzing the die attach film/material properties and thickness requirements

KU3. how to evaluate the curing and attaching conditions of die-attach film/material

KU4. how to recognize the structure of stacking (die thickness and substrate thickness with die attach film/material thickness)

KU5. how to specify the bonding force, pick & place location, curing parameters inside the oven, etc.

KU6. the procedure of setting up all process parameters, such as bonding force, placements, attaching speed, adhesive thickness, wafer and substrate location moving speed, etc.

KU7. how to set to run dummy samples

KU8. the importance of taking measurements to ensure all dimensions are within specification

KU9. the importance of repeating the criteria until the specified criteria are met

KU10. how to turn major input parameters into Standard Operating Procedure (SOP)

KU11. the importance of preparing full SOP and releasing it to production, and considering the special requirements, if required

KU12. the importance of identifying the parameters for the new product verification process

KU13. how to prepare a copy of the old recipe to perform a similar program

KU14. the importance of identifying and making changes as per the product specification requirements

KU15. how to run dummy measurements, Calculate Process Capability (CPK), Process Performance (PPK), and other quality parameters

KU16. the importance and process of verifying the real product using various quality and reliability checks

KU17. the importance of preparing for mass production after all QCs are passed

KU18. how to use Automatic Computer-Aided Design (AUTO-CAD) software

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

KU20. the importance of preparing the SOP with pictures, visuals, data charts to ensure it is more understandable to operators

KU21. the importance of identifying the training needs of operators on SOP flow

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

KU23. the importance of ensuring the quality of all the travelling cards released to production

KU24. the importance of performing regular inspection of programs

KU25. the importance of performing regular inspection of data, such as yield, failure, etc.

KU26. the importance of preparing for emergencies

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 prioritize 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
X Section	**16**	**20**	**-**	**4**
PC1. understand the polishing machine	-	-	-	-
PC2. operate the polishing machine	-	-	-	-
PC3. verify the X Section procedure	-	-	-	-
PC4. verify the Chemical Slurry usage procedure	-	-	-	-
PC5. check Grinding Paper	-	-	-	-
PC6. determine the difference between dry and wet polish	-	-	-	-
De-Cap	**16**	**20**	**-**	**4**
PC7. operate the procedure of Manual De-Cap	-	-	-	-
PC8. operate the Laser De-Cap Machine	-	-	-	-
PC9. understand the chemical composition and create the recipe	-	-	-	-
PC10. verify document and guide operators for recipe use	-	-	-	-
PC11. check the procedure for Multi-Die De-Cap	-	-	-	-
PC12. monitor the procedure to avoid any mishappening (How to use Chemicals)	-	-	-	-
Solder Mask Removal	**8**	**10**	**-**	**2**
PC13. identify the chemical composition and temperature to remove the solder mask	-	-	-	-
PC14. ensure to generate recipes and usages flow documents	-	-	-	-
PC15. manage to guide the operator to use recipes	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	40	50	-	10

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0160
NOS Name	Operate chemical-related process
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	3
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

ELE/N0161: Operate optical microscope and X-Ray Machine

Description

The NOS unit is about operating optical microscope and X-Ray Machine.

Scope

The scope covers the following :

- Operate High-End Microscope
- Operate Low-End Microscope
- Operate X-Ray Machine

Elements and Performance Criteria

Operate High-End Microscope

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

PC1. understand Microscope and its accessories (Lenses etc)
PC2. operate Microscope
PC3. verify the measurements
PC4. analyze the data
PC5. verify the calibration process
PC6. check and Fix Minor Errors
PC7. verify and generate recipes/Programs to do automatic measurement

Operate Low-End Microscope

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

PC8. understand Microscope and its accessories (Lenses etc)
PC9. operate Microscope
PC10. verify the measurements
PC11. analyze the data
PC12. verify the calibration process
PC13. check and ix Minor Errors

Operate X-Ray Machine

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

PC14. understand X-Ray and its accessories (Lenses etc)
PC15. operate X-Ray Machine
PC16. inspects wires, metal layers, passive component issues, etc
PC17. analyze the data
PC18. verify the calibration process
PC19. check and ix minor errors
PC20. verify and generate recipes/Programs to do automatic measurement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. how to identify the die dimensions and back grinding processes
KU2. the importance of analyzing the die attach film/material properties and thickness requirements
KU3. how to evaluate the curing and attaching conditions of die-attach film/material
KU4. how to recognize the structure of stacking (die thickness and substrate thickness with die attach film/material thickness)
KU5. how to specify the bonding force, pick & place location, curing parameters inside the oven, etc.
KU6. the procedure of setting up all process parameters, such as bonding force, placements, attaching speed, adhesive thickness, wafer and substrate location moving speed, etc.
KU7. how to set to run dummy samples
KU8. the importance of taking measurements to ensure all dimensions are within specification
KU9. the importance of repeating the criteria until the specified criteria are met
KU10. how to turn major input parameters into Standard Operating Procedure (SOP)
KU11. the importance of preparing full SOP and releasing it to production, and considering the special requirements, if required
KU12. the importance of identifying the parameters for the new product verification process
KU13. how to prepare a copy of the old recipe to perform a similar program
KU14. the importance of identifying and making changes as per the product specification requirements
KU15. how to run dummy measurements, Calculate Process Capability (CPK), Process Performance (PPK), and other quality parameters
KU16. the importance and process of verifying the real product using various quality and reliability checks
KU17. the importance of preparing for mass production after all QCs are passed
KU18. how to use Automatic Computer-Aided Design (AUTO-CAD) software
KU19. the procedure of preparing process flow with clear specifications, such as temperature, speed, water flow, vacuumed, etc.
KU20. the importance of preparing the SOP with pictures, visuals, data charts to ensure it is more understandable to operators
KU21. the importance of identifying the training needs of operators on SOP flow
KU22. the process of preparing the travelling card with the defined process or program name/ code
KU23. the importance of ensuring the quality of all the travelling cards released to production
KU24. the importance of performing regular inspection of programs
KU25. the importance of performing regular inspection of data, such as yield, failure, etc.
KU26. the importance of preparing for emergencies

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 prioritize 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
Operate High-End Microscope	**16**	**20**	**-**	**4**
PC1. understand Microscope and its accessories (Lenses etc)	-	-	-	-
PC2. operate Microscope	-	-	-	-
PC3. verify the measurements	-	-	-	-
PC4. analyze the data	-	-	-	-
PC5. verify the calibration process	-	-	-	-
PC6. check and Fix Minor Errors	-	-	-	-
PC7. verify and generate recipes/Programs to do automatic measurement	-	-	-	-
Operate Low-End Microscope	**8**	**10**	**-**	**4**
PC8. understand Microscope and its accessories (Lenses etc)	-	-	-	-
PC9. operate Microscope	-	-	-	-
PC10. verify the measurements	-	-	-	-
PC11. analyze the data	-	-	-	-
PC12. verify the calibration process	-	-	-	-
PC13. check and ix Minor Errors	-	-	-	-
Operate X-Ray Machine	**16**	**20**	**-**	**2**
PC14. understand X-Ray and its accessories (Lenses etc)	-	-	-	-
PC15. operate X-Ray Machine	-	-	-	-
PC16. inspects wires, metal layers, passive component issues, etc	-	-	-	-
PC17. analyze the data	-	-	-	-
PC18. verify the calibration process	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC19. check and ix minor errors	-	-	-	-
PC20. verify and generate recipes/Programs to do automatic measurement	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0161
NOS Name	Operate optical microscope and X-Ray Machine
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Quality Assurance
NSQF Level	5
Credits	3
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

ELE/N0162: Operate Scanning Electron Microscope (SEM), Confocal Scanning Electron Microscopy (CSEM) & Focused Ion Beam (FIB)

Description

The NOS unit is about operating Scanning Electron Microscope (SEM), Confocal Scanning Electron Microscopy (CSEM) & Focused Ion Beam (FIB).

Scope

The scope covers the following :

- Operate Scanning Electron Microscope (SEM)
- Operate Confocal Scanning Acoustic Microscopy (CSAM)
- Operate Focused Ion Beam (FIB)

Elements and Performance Criteria

Operate Scanning Electron Microscope (SEM)

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

PC1. understand the SEM basic principles

PC2. check and verify the materials

PC3. install the samples

PC4. analyze sample and measurement

PC5. check the Energy Dispersive X-Ray Analysis (EDX)

PC6. prepare procedure and document

PC7. guide train operators & technicians

PC8. verify the calibration process

Operate Confocal Scanning Acoustic Microscopy (CSAM)

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

PC9. understand the CSAM Basic Principles (Sound Waves Reflections, Deflections, Transmissions, etc)

PC10. operate CSAM

PC11. analyze the reflected waves

PC12. analyze the data

PC13. verify the calibration process

PC14. check load and unload samples

Operate Focused Ion Beam (FIB)

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

PC15. understand the FIB basic principles

PC16. check and verify the materials

PC17. install the samples

PC18. analyze sample and measurement

PC19. check the Energy Dispersive X-Ray Analysis (EDX)
PC20. prepare procedure and document
PC21. guide Train Operators & Technicians
PC22. verify the calibration process

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. how to identify the die dimensions and back grinding processes
KU2. the importance of analyzing the die attach film/material properties and thickness requirements
KU3. how to evaluate the curing and attaching conditions of die-attach film/material
KU4. how to recognize the structure of stacking (die thickness and substrate thickness with die attach film/material thickness)
KU5. how to specify the bonding force, pick & place location, curing parameters inside the oven, etc.
KU6. the procedure of setting up all process parameters, such as bonding force, placements, attaching speed, adhesive thickness, wafer and substrate location moving speed, etc.
KU7. how to set to run dummy samples
KU8. the importance of taking measurements to ensure all dimensions are within specification
KU9. the importance of repeating the criteria until the specified criteria are met
KU10. how to turn major input parameters into Standard Operating Procedure (SOP)
KU11. the importance of preparing full SOP and releasing it to production, and considering the special requirements, if required
KU12. the importance of identifying the parameters for the new product verification process
KU13. how to prepare a copy of the old recipe to perform a similar program
KU14. the importance of identifying and making changes as per the product specification requirements
KU15. how to run dummy measurements, Calculate Process Capability (CPK), Process Performance (PPK), and other quality parameters
KU16. the importance and process of verifying the real product using various quality and reliability checks
KU17. the importance of preparing for mass production after all QCs are passed
KU18. how to use Automatic Computer-Aided Design (AUTO-CAD) software
KU19. the procedure of preparing process flow with clear specifications, such as temperature, speed, water flow, vacuumed, etc.
KU20. the importance of preparing the SOP with pictures, visuals, data charts to ensure it is more understandable to operators
KU21. the importance of identifying the training needs of operators on SOP flow
KU22. the process of preparing the travelling card with the defined process or program name/ code
KU23. the importance of ensuring the quality of all the travelling cards released to production
KU24. the importance of performing regular inspection of programs

KU25. the importance of performing regular inspection of data, such as yield, failure, etc.
KU26. the importance of preparing for emergencies

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 prioritize 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
Operate Scanning Electron Microscope (SEM)	**16**	**18**	**-**	**4**
PC1. understand the SEM basic principles	-	-	-	-
PC2. check and verify the materials	-	-	-	-
PC3. install the samples	-	-	-	-
PC4. analyze sample and measurement	-	-	-	-
PC5. check the Energy Dispersive X-Ray Analysis (EDX)	-	-	-	-
PC6. prepare procedure and document	-	-	-	-
PC7. guide train operators & technicians	-	-	-	-
PC8. verify the calibration process	-	-	-	-
Operate Confocal Scanning Acoustic Microscopy (CSAM)	**8**	**14**	**-**	**2**
PC9. understand the CSAM Basic Principles (Sound Waves Reflections, Deflections, Transmissions, etc)	-	-	-	-
PC10. operate CSAM	-	-	-	-
PC11. analyze the reflected waves	-	-	-	-
PC12. analyze the data	-	-	-	-
PC13. verify the calibration process	-	-	-	-
PC14. check load and unload samples	-	-	-	-
Operate Focused Ion Beam (FIB)	**16**	**18**	**-**	**4**
PC15. understand the FIB basic principles	-	-	-	-
PC16. check and verify the materials	-	-	-	-
PC17. install the samples	-	-	-	-
PC18. analyze sample and measurement	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC19. check the Energy Dispersive X-Ray Analysis (EDX)	-	-	-	-
PC20. prepare procedure and document	-	-	-	-
PC21. guide Train Operators & Technicians	-	-	-	-
PC22. verify the calibration process	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0162
NOS Name	Operate Scanning Electron Microscope (SEM), Confocal Scanning Electron Microscopy (CSEM) & Focused Ion Beam (FIB)
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Quality Assurance
NSQF Level	5
Credits	3
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

ELE/N0163: Understanding of full failure Analysis flow

Description

The NOS unit is about understanding of full failure analysis flow.

Scope

The scope covers the following :

- Electrical Failure Analysis
- Non-Destructive Failure Analysis
- Operate Focused Ion Beam (FIB)

Elements and Performance Criteria

Electrical Failure Analysis

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

PC1. manage electrical tools such as Prober, Small Tester, Multimeters

PC2. identify product testing pad

PC3. identify the failure

PC4. review the internal structure of products

PC5. check the flow and make the document

PC6. guide train operators & technicians

Non-Destructive Failure Analysis

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

PC7. check the procedures

PC8. monitor non-destructive failure and analyze the tools

PC9. prepare standard operating procedures & Documents

PC10. manage all safety rules and make documents

PC11. prepare a presentation in such a way that helps process engineers to optimize the process to reduce failures

PC12. perform all the steps with efficiency & accuracy

Operate Focused Ion Beam (FIB)

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

PC13. check the procedures

PC14. monitor non-destructive failure and analyze the tools

PC15. prepare standard operating procedures & Documents

PC16. manage all safety rules and make documents

PC17. prepare a presentation in such a way that helps process engineers to optimize the process to reduce failures

PC18. perform all the steps with efficiency & accuracy

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance of defining all die dimensions, stacking combination, and wire bonding parameters
KU2. how to define sample size for each lot to measure all dimensions
KU3. the importance of preparing the measurement techniques in the SOP for operators
KU4. the importance of analyzing the collected data and performing statistical analysis to determine if it is within the specification before releasing the lot to the next step
KU5. how to identify the consumables pack specifications
KU6. the importance of regularly inspecting for each consumable
KU7. how to identify any failure at die attach
KU8. the importance of ensuring wire bond passes through failure analysis
KU9. the importance of checking the root cause of each failure
KU10. the importance of defining the short term and long-term actions or failures to reduce the failure rate
KU11. how to prepare an 8D report
KU12. the importance of preparing the yield data collection for each product
KU13. how to analyze the yield
KU14. the importance of analyzing data using statistical methods
KU15. the importance of recording all failures along with actions to avoid future failure
KU16. the importance of performing Research and Development (R&D) and preparing strategies for further improvements
KU17. the working principle of machines to improve UPH
KU18. how to develop the design of experiments (DOE) expertise
KU19. the process of running statistical tools, such as the Joint Manpower Program (JMP)
KU20. the importance of regularly interacting with customers, suppliers, and internal teams
KU21. the process generating designs using Auto-CAD

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 prioritize 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
Electrical Failure Analysis	**16**	**18**	**-**	**4**
PC1. manage electrical tools such as Prober, Small Tester, Multimeters	-	-	-	-
PC2. identify product testing pad	-	-	-	-
PC3. identify the failure	-	-	-	-
PC4. review the internal structure of products	-	-	-	-
PC5. check the flow and make the document	-	-	-	-
PC6. guide train operators & technicians	-	-	-	-
Non-Destructive Failure Analysis	**12**	**16**	**-**	**3**
PC7. check the procedures	-	-	-	-
PC8. monitor non-destructive failure and analyze the tools	-	-	-	-
PC9. prepare standard operating procedures & Documents	-	-	-	-
PC10. manage all safety rules and make documents	-	-	-	-
PC11. prepare a presentation in such a way that helps process engineers to optimize the process to reduce failures	-	-	-	-
PC12. perform all the steps with efficiency & accuracy	-	-	-	-
Operate Focused Ion Beam (FIB)	**12**	**16**	**-**	**3**
PC13. check the procedures	-	-	-	-
PC14. monitor non-destructive failure and analyze the tools	-	-	-	-
PC15. prepare standard operating procedures & Documents	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC16. manage all safety rules and make documents	-	-	-	-
PC17. prepare a presentation in such a way that helps process engineers to optimize the process to reduce failures	-	-	-	-
PC18. perform all the steps with efficiency & accuracy	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0163
NOS Name	Understanding of full failure Analysis flow
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Quality Assurance
NSQF Level	5
Credits	3
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

ELE/N0164: Report Preparation & guidance to the Process Engineer

Description

The NOS unit is about preparing reports and support engineer during work.

Scope

The scope covers the following :

- Report Preparation and Guidance to Process Engineer

Elements and Performance Criteria

Report Preparation and Guidance to Process Engineer

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

PC1. check the chip packaging and process flow
PC2. analyze the definitions of failure categories
PC3. analyze physical failure and electrical failure
PC4. check all failures based on defined categories
PC5. identify each failure related to the process with accuracy
PC6. generate a well-defined failure analysis report
PC7. prepare & present the report to all process engineers and explain the failures
PC8. check the improvements that need to be made and guide process engineers
PC9. review each failure mode and allows them to decide that the failure is not a physical failure

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. how to prepare the File Allocation Table (FAT) report
KU2. how to identify all specifications as per the organizational standards
KU3. the importance of ensuring the functioning of the main controller and the main panel as per the requirements given to the manufacturer
KU4. the importance of ensuring all equipment consumable specifications, dimensions and other parameters are clearly defined by the process and equipment engineer
KU5. the importance and process of preparing the equipment and process parameters
KU6. the importance of defining and preparing sample size required to buy off machines as per the specifications and CPK Requirements
KU7. the importance of preparing a comprehensive report to avoid any future issues
KU8. the importance of recording all approvals in the appropriate formats as per the organizational standards
KU9. the importance of ensuring the functioning of the main controller and the main panel as per requirements given to the manufacturer

KU10. the importance of preparing the equipment consumables according to the specifications, dimensions and other parameters defined by the process and equipment engineer

KU11. how to prepare the sample size required to buy off machines and the importance of ensuring it is defined clearly according to the specifications and CPK requirements

KU12. the importance of using low cost and highly reliable raw material and consumables

KU13. how to verify new material to design DOE

KU14. the process of collecting the quality and reliability data for each characterization, feasibility, and building the qualification

KU15. how to generate the Process Change Notification (PCN)

KU16. the process of transitioning from low volume mass production to high volume mass production

KU17. the characterization phase, feasibility phase, customer sampling phase, and qualification phase is required

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 prioritize 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
Report Preparation and Guidance to Process Engineer	**40**	**50**	**-**	**10**
PC1. check the chip packaging and process flow	-	-	-	-
PC2. analyze the definitions of failure categories	-	-	-	-
PC3. analyze physical failure and electrical failure	-	-	-	-
PC4. check all failures based on defined categories	-	-	-	-
PC5. identify each failure related to the process with accuracy	-	-	-	-
PC6. generate a well-defined failure analysis report	-	-	-	-
PC7. prepare & present the report to all process engineers and explain the failures	-	-	-	-
PC8. check the improvements that need to be made and guide process engineers	-	-	-	-
PC9. review each failure mode and allows them to decide that the failure is not a physical failure	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0164
NOS Name	Report Preparation & guidance to the Process Engineer
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Quality Assurance
NSQF Level	5
Credits	3
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

ELE/N0165: Reliability Flow & Testing

Description

The NOS unit is about testing and identifing reliability flow.

Scope

The scope covers the following :

- Reliability Test Requirement
- Reliability Test Equipment Operation
- Reliability Procedure and flow

Elements and Performance Criteria

Reliability Test Requirement

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

PC1. identify the customer's reliability requirements
PC2. verify internal reliability requirements based on customers' requirements
PC3. prepare a sample for reliability
PC4. prepare test after each checkpoint
PC5. verify PFA if necessary and maintain reliability
PC6. verify DPPM and life of the product
PC7. identify early and mature failures

Reliability Test Equipment Operation

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

PC8. identify reliability tools required for products
PC9. check the basic operation procedure
PC10. identify loading and unloading samples
PC11. perform basic programming
PC12. identify failures
PC13. perform testing equipment required to verify the failures
PC14. identify reliability conditions such as temperature, humidity, shock required for tastings
PC15. check all safety rules and guidelines inside the lab
PC16. guide the reliability team to define reliability specifications

Reliability Procedure and flow

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

PC17. identify international reliability standards such as JEDEC
PC18. identify reliability specifications using JEDEC Standards
PC19. prepare reliability documents with flow and specifications required to test
PC20. check which reliability test is required for which product

PC21. test the reliability flow and start the procedure for new products
PC22. understand the PCN's & ECN's reliability requirements
PC23. prepare a report and get approvals

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the use of Auto CAD and other equivalent design tools
KU2. the wafer structure and processing, and wire material properties
KU3. the importance of determining the customer requirements and collecting data from competitors' specs
KU4. how to perform reverse analysis to get the die to attach and wire bonding specifications
KU5. the importance of identifying the critical and normal dimension requirements as per the customer requirements
KU6. the importance and process of defining the dimension specifications to meet the customer requirements
KU7. the Joint Electron Device Engineering Council (JEDEC) standard
KU8. the customer bonding diagram
KU9. the importance of specifying the wire bonding material that fulfils the bonding drawing and electrical, mechanical, and thermal specifications
KU10. how to perform drawing activities bonding drawing
KU11. how to verify the die-attach staking structure
KU12. how to verify rubber tip for die attach and capillary for wire bonding drawing
KU13. how to identify magazine drawing and cassette drawing

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 prioritize 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
Reliability Test Requirement	**12**	**16**	**-**	**2**
PC1. identify the customer's reliability requirements	-	-	-	-
PC2. verify internal reliability requirements based on customers' requirements	-	-	-	-
PC3. prepare a sample for reliability	-	-	-	-
PC4. prepare test after each checkpoint	-	-	-	-
PC5. verify PFA if necessary and maintain reliability	-	-	-	-
PC6. verify DPPM and life of the product	-	-	-	-
PC7. identify early and mature failures	-	-	-	-
Reliability Test Equipment Operation	**16**	**18**	**-**	**4**
PC8. identify reliability tools required for products	-	-	-	-
PC9. check the basic operation procedure	-	-	-	-
PC10. identify loading and unloading samples	-	-	-	-
PC11. perform basic programming	-	-	-	-
PC12. identify failures	-	-	-	-
PC13. perform testing equipment required to verify the failures	-	-	-	-
PC14. identify reliability conditions such as temperature, humidity, shock required for tastings	-	-	-	-
PC15. check all safety rules and guidelines inside the lab	-	-	-	-
PC16. guide the reliability team to define reliability specifications	-	-	-	-
Reliability Procedure and flow	**12**	**16**	**-**	**4**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC17. identify international reliability standards such as JEDEC	-	-	-	-
PC18. identify reliability specifications using JEDEC Standards	-	-	-	-
PC19. prepare reliability documents with flow and specifications required to test	-	-	-	-
PC20. check which reliability test is required for which product	-	-	-	-
PC21. test the reliability flow and start the procedure for new products	-	-	-	-
PC22. understand the PCN's & ECN's reliability requirements	-	-	-	-
PC23. prepare a report and get approvals	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0165
NOS Name	Reliability Flow & Testing
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Quality Assurance
NSQF Level	5
Credits	2
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

Qualification Pack

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

Description

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

Scope

The scope covers the following :

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

Elements and Performance Criteria

Introduction to Employability Skills

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

PC1. identify employability skills required for jobs in various industries

PC2. identify and explore learning and employability portals

Constitutional values – Citizenship

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

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

PC4. follow environmentally sustainable practices

Becoming a Professional in the 21st Century

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

PC5. recognize the significance of 21st Century Skills for employment

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

Basic English Skills

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

PC7. use basic English for everyday conversation in different contexts, in person and over the telephone

PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English

PC9. write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

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

PC10. understand the difference between job and career

PC11. prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

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

PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings

PC13. work collaboratively with others in a team

Diversity & Inclusion

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

PC14. communicate and behave appropriately with all genders and PwD

PC15. escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

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

PC16. select financial institutions, products and services as per requirement

PC17. carry out offline and online financial transactions, safely and securely

PC18. identify common components of salary and compute income, expenses, taxes, investments etc

PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

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

PC20. operate digital devices and carry out basic internet operations securely and safely

PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively

PC22. use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

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

PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research

PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion

PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

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

PC26. identify different types of customers

PC27. identify and respond to customer requests and needs in a professional manner.

PC28. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

PC29. create a professional Curriculum vitae (Résumé)

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

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

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

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

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

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

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

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

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

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

KU7. about effective communication

KU8. POSH Act

KU9. Gender sensitivity and inclusivity

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

KU11. how to compute income and expenditure

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

KU13. different legal rights and laws

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

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

KU16. how to identify business opportunities

KU17. types and needs of customers

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

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

Generic Skills (GS)

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

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

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

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

Assessment Criteria

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

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

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

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0102
NOS Name	Employability Skills (60 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below.)

4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria.

5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS.

6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Minimum Aggregate Passing % at QP Level : 70

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

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ELE/N0160.Operate chemical-related process	40	50	-	10	100	15
ELE/N0161.Operate optical microscope and X-Ray Machine	40	50	-	10	100	15
ELE/N0162.Operate Scanning Electron Microscope (SEM), Confocal Scanning Electron Microscopy (CSEM) & Focused Ion Beam (FIB)	40	50	-	10	100	15
ELE/N0163.Understanding of full failure Analysis flow	40	50	-	10	100	15
ELE/N0164.Report Preparation & guidance to the Process Engineer	40	50	-	10	100	15
ELE/N0165.Reliability Flow & Testing	40	50	-	10	100	15
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	10
Total	**260**	**330**	**-**	**60**	**650**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualification Framework
OJT	On the Job Training
National Occupational Standard	NOS defines the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process is obtained when a the competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information about a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service, or technology.

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.