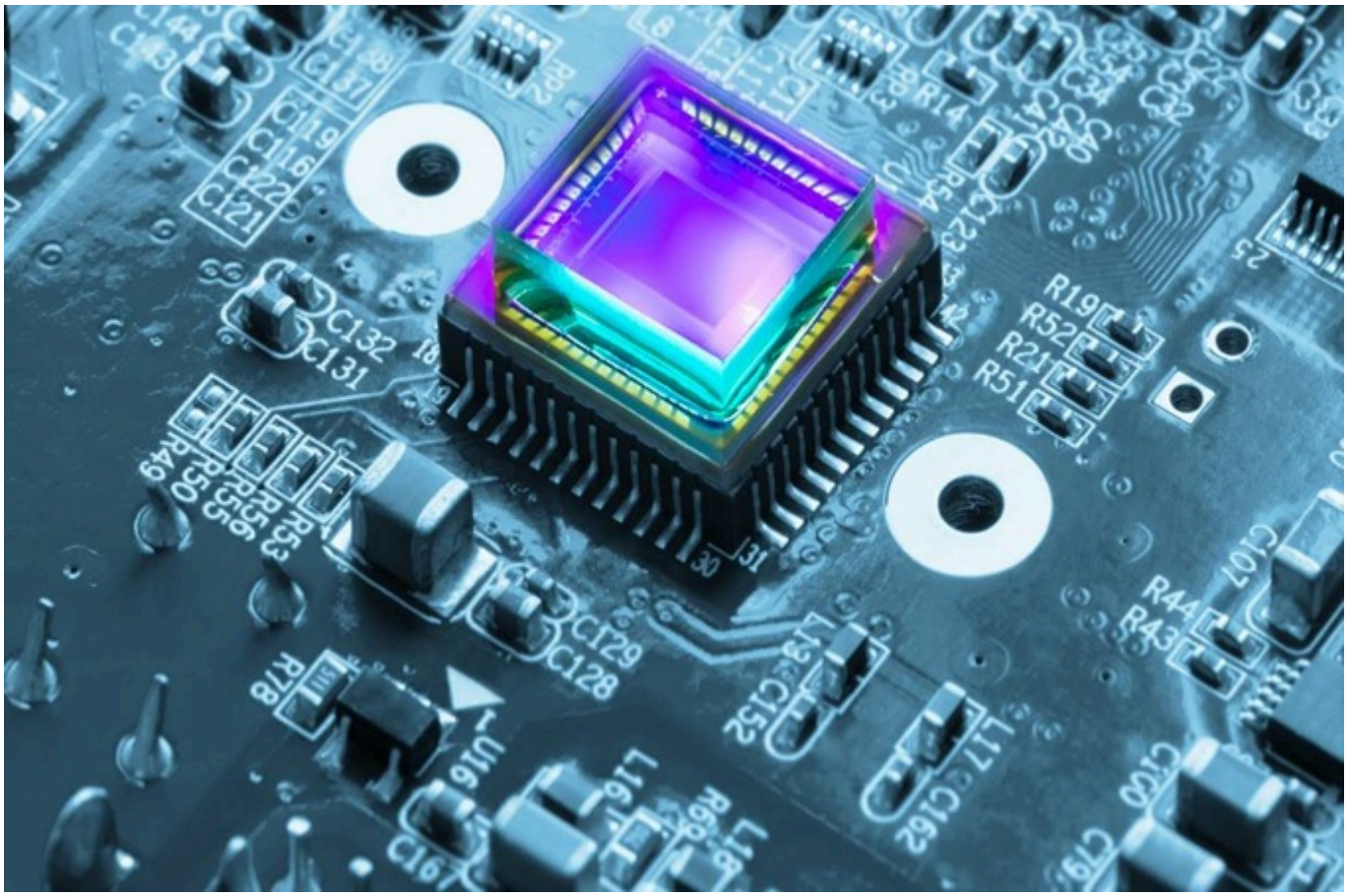
Qualification Pack



Package Design Engineer (Semiconductor)

QP Code: ELE/Q0123

Version: 3.0

NSQF Level: 5

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House Okhla Industrial Area-Phase 3
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Qualification Pack

ELE/Q0123: Package Design Engineer (Semiconductor)

Brief Job Description

Package Design Engineer (Semiconductor) works on Designing software & responsible for designing & defining of layouts for different type of IC Packages. He is also responsible for Test Program preparation for all type of IC Packages available with product or Research & Development Team. He also assists in the design verifications.

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/N0156: Package Design
2. ELE/N0157: Electrical Simulation
3. ELE/N0158: Thermal Simulation
4. ELE/N0159: Mechanical Simulation
5. DGT/VSQ/N0102: Employability Skills (60 Hours)

Qualification Pack (QP) Parameters

Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Product Design-S&C
Country	India
NSQF Level	5
Credits	19
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3118.0302

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	20/06/2025
Version	3.0
Reference code on NQR	QG-05-EH-03992-2025-V3-ESSCI
NQR Version	3.0

Remarks:

NA

ELE/N0156: Package Design

Description

The NOS unit is about design and optimize semiconductor packaging through detailed schematic, netlist, substrate, and wire bond development to ensure manufacturable, cost-effective, and high-performance products.

Scope

The scope covers the following :

- Package Design
- Netlist
- Substrate Design
- Wire bond Diagram Design

Elements and Performance Criteria

Package Design

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

PC1. Sketch rough package as per specification

PC2. Discuss with each process engineer for processibility

PC3. Discuss with each process engineer for Material usage

PC4. Feasibility study and characterization methods to optimize best design

PC5. Package Design tool expert

PC6. Create Design File using the optimized physical design

PC7. Figure out best design that help engineers to convert into products

PC8. Good understanding of material, package dimensions, package structures, semiconductors etc.

PC9. Good Understanding of Each package process flow

PC10. Basic Knowledge of each Equipment)

PC11. prepare full SOP and release to production

PC12. perform special requirements is needed

Netlist

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

PC13. Understanding of wafer (Device/Die) PAD locations & their electrical characteristics

PC14. Understanding of output pins and their electrical characteristics

PC15. Based on above two points Create Schematic

PC16. Create netlist using above schematic

PC17. Use this netlist to create package design

PC18. Good understanding of design, functionalities such as layer, location, bending angles, thickness, layer thickness etc

PC19. Optional - Can start building mechanical sample to verify this design

PC20. Clear all check points using mechanical samples

Substrate Design

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

PC21. Create substrate layout

PC22. Create multiple metal layers as per customer requirements

PC23. Create and optimize vias

PC24. Optimize for best core materials

PC25. Optimize for best Dimensions (Vias, Core Material, Solder Mask etc)

Wire bond Diagram Design

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

PC26. Based on netlist create wire bond diagram

PC27. Optimize wire bond loop

PC28. Optimize wire bond thickness

PC29. Optimize substrate wire bond PAD's dimensions

PC30. Based on all above parameters wire bonding should be low cost and processible design

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
Package Design	**22**	**26**	**-**	**4**
PC1. Sketch rough package as per specification	-	-	-	-
PC2. Discuss with each process engineer for processibility	-	-	-	-
PC3. Discuss with each process engineer for Material usage	-	-	-	-
PC4. Feasibility study and characterization methods to optimize best design	-	-	-	-
PC5. Package Design tool expert	-	-	-	-
PC6. Create Design File using the optimized physical design	-	-	-	-
PC7. Figure out best design that help engineers to convert into products	-	-	-	-
PC8. Good understanding of material, package dimensions, package structures, semiconductors etc.	-	-	-	-
PC9. Good Understanding of Each package process flow	-	-	-	-
PC10. Basic Knowledge of each Equipment)	-	-	-	-
PC11. prepare full SOP and release to production	-	-	-	-
PC12. perform special requirements is needed	-	-	-	-
Netlist	**8**	**12**	**-**	**2**
PC13. Understanding of wafer (Device/Die) PAD locations & their electrical characteristics	-	-	-	-
PC14. Understanding of output pins and their electrical characteristics	-	-	-	-
PC15. Based on above two points Create Schematic	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC16. Create netlist using above schematic	-	-	-	-
PC17. Use this netlist to create package design	-	-	-	-
PC18. Good understanding of design, functionalities such as layer, location, bending angles, thickness, layer thickness etc	-	-	-	-
PC19. Optional - Can start building mechanical sample to verify this design	-	-	-	-
PC20. Clear all check points using mechanical samples	-	-	-	-
Substrate Design	**5**	**6**	**-**	**2**
PC21. Create substrate layout	-	-	-	-
PC22. Create multiple metal layers as per customer requirements	-	-	-	-
PC23. Create and optimize vias	-	-	-	-
PC24. Optimize for best core materials	-	-	-	-
PC25. Optimize for best Dimensions (Vias, Core Material, Solder Mask etc)	-	-	-	-
Wire bond Diagram Design	**5**	**6**	**-**	**2**
PC26. Based on netlist create wire bond diagram	-	-	-	-
PC27. Optimize wire bond loop	-	-	-	-
PC28. Optimize wire bond thickness	-	-	-	-
PC29. Optimize substrate wire bond PAD's dimensions	-	-	-	-
PC30. Based on all above parameters wire bonding should be low cost and processible design	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0156
NOS Name	Package Design
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	5
Version	2.0
Last Reviewed Date	20/06/2025
Next Review Date	31/10/2025
NSQC Clearance Date	20/06/2025

ELE/N0157: Electrical Simulation

Description

The NOS unit is about to verify and optimize semiconductor package designs through electrical simulations and analysis of signal integrity, RLC parameters, and reliability to ensure performance and early issue detection.

Scope

The scope covers the following :

- To Verify Package Design

Elements and Performance Criteria

To Verify Package Design

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

PC1. Good Understanding of fabrication processes
PC2. Good understanding of device structure
PC3. Good understanding of material properties (Electrical Behaviour) of device and package
PC4. Good understanding of All materials Electrical Characteristics
PC5. Good Understanding of Interaction of Die/Device with package material
PC6. Expert in electrical simulation tool
PC7. Use the package design file to simulate it
PC8. Good understanding of Signal integrity
PC9. Good Understanding of RLC Parameters
PC10. Good understanding of Eye Diagrams
PC11. How to observe & create Signal integrity, RLC Parameters and Eye Diagrams
PC12. Find out early-stage electrical issues
PC13. Fix those issues
PC14. Release DOE to verify simulation parameters
PC15. Find out best leg based on DOE and verify it by releasing bigger sample size
PC16. Simulate the design for realibity condition tool
PC17. Document every process, Parameters etc

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
To Verify Package Design	**40**	**50**	**-**	**10**
PC1. Good Understanding of fabrication processes	-	-	-	-
PC2. Good understanding of device structure	-	-	-	-
PC3. Good understanding of material properties (Electrical Behaviour) of device and package	-	-	-	-
PC4. Good understanding of All materials Electrical Characteristics	-	-	-	-
PC5. Good Understanding of Interaction of Die/Device with package material	-	-	-	-
PC6. Expert in electrical simulation tool	-	-	-	-
PC7. Use the package design file to simulate it	-	-	-	-
PC8. Good understanding of Signal integrity	-	-	-	-
PC9. Good Understanding of RLC Parameters	-	-	-	-
PC10. Good understanding of Eye Diagrams	-	-	-	-
PC11. How to observe & create Signal integrity, RLC Parameters and Eye Diagrams	-	-	-	-
PC12. Find out early-stage electrical issues	-	-	-	-
PC13. Fix those issues	-	-	-	-
PC14. Release DOE to verify simulation parameters	-	-	-	-
PC15. Find out best leg based on DOE and verify it by releasing bigger sample size	-	-	-	-
PC16. Simulate the design for realibity condition tool	-	-	-	-
PC17. Document every process, Parameters etc	-	-	-	-

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

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0157
NOS Name	Electrical Simulation
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	4
Version	2.0
Last Reviewed Date	20/06/2025
Next Review Date	31/10/2025
NSQC Clearance Date	20/06/2025

ELE/N0158: Thermal Simulation

Description

The NOS unit is about to verify and optimize semiconductor package designs using thermal simulations to assess material behavior, identify early thermal issues, and ensure reliability under defined operating conditions.

Scope

The scope covers the following :

- To Verify Package Design

Elements and Performance Criteria

To Verify Package Design

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

PC1. good Understanding of fabrication processes
PC2. good understanding of device structure
PC3. good understanding of material properties (thermal behaviour) of device and package
PC4. good understanding of All materials thermal Characteristics
PC5. good understanding of Interaction of Die/Device with package material
PC6. expert in thermal simulation tool
PC7. use the package design file to simulate it
PC8. good understanding of thermal parameters
PC9. good Understanding of melting point, CTE, TG, Curing Temperature etc.
PC10. good understanding of behaviour of PC.9 Properties
PC11. how to observe & create thermal simulation diagram
PC12. find out early-stage thermal issues
PC13. fix those issues
PC14. release DOE to verify simulation parameters
PC15. find out best leg based on DOE and verify it by releasing bigger sample size
PC16. simulate the design for realibity condition tool

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
To Verify Package Design	**40**	**50**	**-**	**10**
PC1. good Understanding of fabrication processes	-	-	-	-
PC2. good understanding of device structure	-	-	-	-
PC3. good understanding of material properties (thermal behaviour) of device and package	-	-	-	-
PC4. good understanding of All materials thermal Characteristics	-	-	-	-
PC5. good understanding of Interaction of Die/Device with package material	-	-	-	-
PC6. expert in thermal simulation tool	-	-	-	-
PC7. use the package design file to simulate it	-	-	-	-
PC8. good understanding of thermal parameters	-	-	-	-
PC9. good Understanding of melting point, CTE, TG, Curing Temperature etc.	-	-	-	-
PC10. good understanding of behaviour of PC.9 Properties	-	-	-	-
PC11. how to observe & create thermal simulation diagram	-	-	-	-
PC12. find out early-stage thermal issues	-	-	-	-
PC13. fix those issues	-	-	-	-
PC14. release DOE to verify simulation parameters	-	-	-	-
PC15. find out best leg based on DOE and verify it by releasing bigger sample size	-	-	-	-
PC16. simulate the design for realibity condition tool	-	-	-	-

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/N0158
NOS Name	Thermal Simulation
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	4
Version	2.0
Last Reviewed Date	20/06/2025
Next Review Date	31/10/2025
NSQC Clearance Date	20/06/2025

ELE/N0159: Mechanical Simulation

Description

The NOS unit is about to Verify and optimize semiconductor package designs using mechanical simulations and testing to evaluate material strength, identify early mechanical issues, and ensure structural reliability under environmental conditions.

Scope

The scope covers the following :

- To Verify Package Design

Elements and Performance Criteria

To Verify Package Design

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

PC1. good understanding of fabrication processes
PC2. good understanding of device structure
PC3. good understanding of material properties (Mechanical Behaviour) of device and package
PC4. good understanding of All materials Mechanical Characteristics
PC5. good Understanding of Interaction of Die/Device with package material
PC6. expert in Mechanical simulation tool
PC7. use the package design file to simulate it
PC8. good understanding of material strength and its behaviour with temperature and humidity
PC9. good Understanding of melting point, CTE, TG, Curing Temperature etc.
PC10. good understanding of behaviour of PC.9 Properties on mechanical strength of each layer separately and combined package
PC11. how to observe & create mechanical simulation diagram
PC12. find out early-stage mechanical issues
PC13. fix those issues
PC14. release DOE to verify simulation parameters
PC15. find out best leg based on DOE and verify it by releasing bigger sample size
PC16. simulate the design for realibity condition tool
PC17. good understanding of physical verification tool as such as Mechanical testers (To measure tensile strength, breaking strength etc.)
PC18. document every process, Parameters etc

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
To Verify Package Design	**40**	**50**	**-**	**10**
PC1. good understanding of fabrication processes	-	-	-	-
PC2. good understanding of device structure	-	-	-	-
PC3. good understanding of material properties (Mechanical Behaviour) of device and package	-	-	-	-
PC4. good understanding of All materials Mechanical Characteristics	-	-	-	-
PC5. good Understanding of Interaction of Die/Device with package material	-	-	-	-
PC6. expert in Mechanical simulation tool	-	-	-	-
PC7. use the package design file to simulate it	-	-	-	-
PC8. good understanding of material strength and its behaviour with temperature and humidity	-	-	-	-
PC9. good Understanding of melting point, CTE, TG, Curing Temperature etc.	-	-	-	-
PC10. good understanding of behaviour of PC.9 Properties on mechanical strength of each layer separately and combined package	-	-	-	-
PC11. how to observe & create mechanical simulation diagram	-	-	-	-
PC12. find out early-stage mechanical issues	-	-	-	-
PC13. fix those issues	-	-	-	-
PC14. release DOE to verify simulation parameters	-	-	-	-
PC15. find out best leg based on DOE and verify it by releasing bigger sample size	-	-	-	-
PC16. simulate the design for realibity condition tool	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC17. good understanding of physical verification tool as such as Mechanical testers (To measure tensile strength, breaking strength etc.)	-	-	-	-
PC18. document every process, Parameters etc	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0159
NOS Name	Mechanical Simulation
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	4
Version	2.0
Last Reviewed Date	20/06/2025
Next Review Date	31/10/2025
NSQC Clearance Date	20/06/2025

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/N0156.Package Design	40	50	-	10	100	20
ELE/N0157.Electrical Simulation	40	50	-	10	100	20
ELE/N0158.Thermal Simulation	40	50	-	10	100	20
ELE/N0159.Mechanical Simulation	40	50	-	10	100	20
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	20
Total	**180**	**230**	**-**	**40**	**450**	**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.