Qualification Pack

Electronic Hardware Design Engineer

QP Code: ELE/Q6102

Version: 4.0

NSQF Level: 5

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Contents

Qualification Pack

ELE/Q6102: Electronic Hardware Design Engineer

Brief Job Description

The individual at work is responsible for undertaking research on new products, work with R&D on developing the schematics, converting them to PCB layout using CAD and other software and generating the Gerber file to pass on to PCB manufacturers.

Personal Attributes

The job requires the individual to attention to detail, good eyesight, and physically fit with ability to work for long hours on computer.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ELE/N8707: Develop and testing of PCB prototype
2. ELE/N8708: Ensuring Product Excellence and Collaboration
3. DGT/VSQ/N0102: Employability Skills (60 Hours)

Qualification Pack (QP) Parameters

Sector	Electronics
Sub-Sector	PCB Design and Manufacturing
Occupation	Research and Design-PCB
Country	India
NSQF Level	5
Credits	19
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2152.0801

Minimum Educational Qualification & Experience	Completed 2nd year of UG (UG Diploma) (Physics/Electronics/Electrical/Computer Science) with 1.5 years of experience in PCB Design & Manufacturing OR Completed 3-year diploma (after 10th) (Electronics/Electrical/Computer Science) with 3 Years of experience in PCB Design & Manufacturing OR Certificate-NSQF (Level 4.5) with 1.5 years of experience in PCB Design & Manufacturing
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	30/04/2028
NSQC Approval Date	08/05/2025
Version	4.0
Reference code on NQR	QG-05-EH-03980-2025-V4-ESSCI
NQR Version	4.0

Remarks:

NA

Qualification Pack

ELE/N8707: Develop and testing of PCB prototype

Description

This NOS unit is about design, develop, and validate electronic hardware systems through requirement analysis, circuit design, PCB layout, prototyping, and testing to meet product specifications.

Scope

The scope covers the following :

- Understanding new product specifications
- Designing Electronic Circuits
- Developing PCB Layouts
- Prototyping and Testing

Elements and Performance Criteria

Understanding new product specifications

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

PC1. Interact with customers to understand hardware specifications and functional requirements.

PC2. Analyze the technical feasibility of product requirements and provide feedback to stakeholders.

PC3. Collaborate with cross-functional teams to define hardware specifications, interfaces, and performance metrics.

PC4. Research and evaluate new technologies and components to meet product requirements.

Designing Electronic Circuits

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

PC5. Develop schematic diagrams using design software (e.g., Altium, KiCad, OrCAD).

PC6. Select and evaluate electronic components for functionality, reliability, and cost-effectiveness.

PC7. Design high-speed, low-power, or high-frequency circuits based on application requirements.

PC8. Perform simulations to validate circuit performance under various conditions (e.g., thermal, EMI/EMC).

PC9. Optimize designs for manufacturability, testability, and scalability.

Developing PCB Layouts

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

PC10. Create PCB layouts adhering to design rules and manufacturing constraints.

PC11. Perform impedance control, differential pair routing, and high-speed signal routing for critical designs.

PC12. Validate the PCB design through design rule checks (DRC) and electrical rule checks (ERC).

PC13. Generate Gerber files and fabrication packages for manufacturing.

PC14. Collaborate with PCB manufacturers to resolve design-related queries.

Prototyping and Testing

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

PC15. Assemble and test prototypes to validate design functionality and performance.

PC16. Perform debugging and troubleshooting of hardware issues using test equipment (e.g., oscilloscopes, logic analyzers).

PC17. Validate hardware against product specifications and performance criteria.

PC18. Document test procedures, results, and deviations for future reference.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Principles of electronic circuit design, including analog and digital fundamentals.

KU2. Hardware design tools such as Altium, KiCad, and OrCAD for schematic and PCB layout.

KU3. Industry standards and best practices for PCB design, including DRC, ERC, and EMI/EMC compliance.

KU4. Component selection criteria based on functionality, reliability, and cost.

KU5. Techniques for high-speed, low-power, and high-frequency circuit design.

KU6. Simulation tools and methodologies for validating electronic designs under varied conditions.

KU7. Manufacturing processes and constraints related to PCB fabrication and assembly.

KU8. Methods of prototyping, testing, and debugging hardware using tools like oscilloscopes and logic analyzers.

KU9. Product requirement analysis and feasibility assessment techniques.

KU10. Documentation standards for design, testing, and production processes.

Generic Skills (GS)

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

GS1. Communication skills for effective interaction with customers, stakeholders, and team members.

GS2. Analytical thinking for evaluating technical feasibility and troubleshooting hardware issues.

GS3. Collaboration and teamwork for working with cross-functional teams.

GS4. Attention to detail in schematic capture, layout design, and testing.

GS5. Time management and task prioritization to meet project deadlines.

GS6. Problem-solving skills for debugging and resolving hardware-related issues.

GS7. Adaptability to rapidly learn and implement new technologies and components.

GS8. Documentation and reporting skills for recording test procedures and design changes.

GS9. Planning and organizational abilities for coordinating prototype development and validation.

GS10. Quality focus to ensure compliance with product specifications and industry standards.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Understanding new product specifications	**12**	**16**	**-**	**-**
PC1. Interact with customers to understand hardware specifications and functional requirements.	-	-	-	-
PC2. Analyze the technical feasibility of product requirements and provide feedback to stakeholders.	-	-	-	-
PC3. Collaborate with cross-functional teams to define hardware specifications, interfaces, and performance metrics.	-	-	-	-
PC4. Research and evaluate new technologies and components to meet product requirements.	-	-	-	-
Designing Electronic Circuits	**10**	**17**	**-**	**-**
PC5. Develop schematic diagrams using design software (e.g., Altium, KiCad, OrCAD).	-	-	-	-
PC6. Select and evaluate electronic components for functionality, reliability, and cost-effectiveness.	-	-	-	-
PC7. Design high-speed, low-power, or high-frequency circuits based on application requirements.	-	-	-	-
PC8. Perform simulations to validate circuit performance under various conditions (e.g., thermal, EMI/EMC).	-	-	-	-
PC9. Optimize designs for manufacturability, testability, and scalability.	-	-	-	-
Developing PCB Layouts	**10**	**15**	**-**	**-**
PC10. Create PCB layouts adhering to design rules and manufacturing constraints.	-	-	-	-
PC11. Perform impedance control, differential pair routing, and high-speed signal routing for critical designs.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Validate the PCB design through design rule checks (DRC) and electrical rule checks (ERC).	-	-	-	-
PC13. Generate Gerber files and fabrication packages for manufacturing.	-	-	-	-
PC14. Collaborate with PCB manufacturers to resolve design-related queries.	-	-	-	-
Prototyping and Testing	**8**	**12**	**-**	**-**
PC15. Assemble and test prototypes to validate design functionality and performance.	-	-	-	-
PC16. Perform debugging and troubleshooting of hardware issues using test equipment (e.g., oscilloscopes, logic analyzers).	-	-	-	-
PC17. Validate hardware against product specifications and performance criteria.	-	-	-	-
PC18. Document test procedures, results, and deviations for future reference.	-	-	-	-
NOS Total	**40**	**60**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N8707
NOS Name	Develop and testing of PCB prototype
Sector	Electronics
Sub-Sector	
Occupation	Research and Design-PCB
NSQF Level	5
Credits	10
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	30/04/2028
NSQC Clearance Date	08/05/2025

Qualification Pack

ELE/N8708: Ensuring Product Excellence and Collaboration

Description

This NOS unit is about ensure regulatory-compliant, reliable, and manufacturable hardware designs by supporting production, driving innovation, collaborating across teams, and maintaining quality, documentation, and continuous improvement throughout the product lifecycle.

Scope

The scope covers the following :

- Ensuring Compliance and Standards
- Supporting Manufacturing and Production
- Continuous Improvement and Innovation
- Collaboration and Communication
- Achieving Productivity and Quality Standards

Elements and Performance Criteria

Ensuring Compliance and Standards

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

PC1. Ensure designs comply with relevant industry standards (e.g., IPC, RoHS, CE, FCC).

PC2. Conduct EMI/EMC testing to ensure regulatory compliance.

PC3. Incorporate safety and reliability features into the hardware design.

PC4. Ensure thermal management and mechanical integrity of hardware designs.

Supporting Manufacturing and Production

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

PC5. Work with production teams to ensure smooth transition from design to manufacturing.

PC6. Develop test jigs and fixtures for production testing.

PC7. Provide technical support for resolving manufacturing and assembly issues.

Continuous Improvement and Innovation

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

PC8. Identify opportunities for cost reduction and performance improvement in existing designs.

PC9. Stay updated with advancements in hardware design tools, components, and technologies.

PC10. Propose innovative solutions to improve product features and performance.

Collaboration and Communication

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

PC11. Collaborate with firmware, software, and mechanical teams to ensure seamless integration.

PC12. Communicate design progress and challenges to stakeholders through presentations and reports.

PC13. Participate in design reviews and provide constructive feedback to peers

Achieving Productivity and Quality Standards

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

PC14. Meet project deadlines and deliverables as per the project plan.
PC15. Ensure hardware designs meet customer specifications and quality standards.
PC16. Work with the quality assurance team to identify and resolve defects.
PC17. Maintain proper documentation of designs, revisions, and test results.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Industry standards and certifications relevant to hardware design (e.g., IPC, RoHS, CE, FCC).
KU2. Principles of EMI/EMC and methods for testing and mitigation.
KU3. Safety and reliability engineering practices in electronic hardware design.
KU4. Concepts of thermal management and mechanical integrity in PCB and enclosure design.
KU5. Manufacturing processes, DFM (Design for Manufacturability), and production workflows.
KU6. Design and development of test jigs and fixtures for production testing.
KU7. Cost optimization and performance improvement strategies for hardware products.
KU8. Emerging trends in hardware design tools, technologies, and electronic components.
KU9. Product lifecycle management including design reviews, documentation, and revision control.
KU10. Quality assurance methodologies and defect resolution processes.

Generic Skills (GS)

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

GS1. Communication skills to present design updates and technical challenges to stakeholders.
GS2. Collaboration skills to work effectively with cross-functional teams (e.g., firmware, software, mechanical).
GS3. Critical thinking for identifying and solving manufacturing and design-related issues.
GS4. Innovation and creativity in proposing enhancements to product performance and features.
GS5. Time management to meet project deadlines and deliverables.
GS6. Problem-solving ability to address EMI/EMC, safety, and thermal challenges.
GS7. Adaptability to keep up with technological advancements and apply them to designs.
GS8. Attention to detail in ensuring compliance, documentation, and design validation.
GS9. Organizational skills for maintaining clear records of design iterations and test outcomes.
GS10. Constructive feedback and review participation for continuous team and design improvement.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Ensuring Compliance and Standards	**11**	**16**	**-**	**-**
PC1. Ensure designs comply with relevant industry standards (e.g., IPC, RoHS, CE, FCC).	-	-	-	-
PC2. Conduct EMI/EMC testing to ensure regulatory compliance.	-	-	-	-
PC3. Incorporate safety and reliability features into the hardware design.	-	-	-	-
PC4. Ensure thermal management and mechanical integrity of hardware designs.	-	-	-	-
Supporting Manufacturing and Production	**9**	**12**	**-**	**-**
PC5. Work with production teams to ensure smooth transition from design to manufacturing.	-	-	-	-
PC6. Develop test jigs and fixtures for production testing.	-	-	-	-
PC7. Provide technical support for resolving manufacturing and assembly issues.	-	-	-	-
Continuous Improvement and Innovation	**6**	**12**	**-**	**-**
PC8. Identify opportunities for cost reduction and performance improvement in existing designs.	-	-	-	-
PC9. Stay updated with advancements in hardware design tools, components, and technologies.	-	-	-	-
PC10. Propose innovative solutions to improve product features and performance.	-	-	-	-
Collaboration and Communication	**6**	**8**	**-**	**-**
PC11. Collaborate with firmware, software, and mechanical teams to ensure seamless integration.	-	-	-	-
PC12. Communicate design progress and challenges to stakeholders through presentations and reports.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. Participate in design reviews and provide constructive feedback to peers	-	-	-	-
Achieving Productivity and Quality Standards	**8**	**12**	**-**	**-**
PC14. Meet project deadlines and deliverables as per the project plan.	-	-	-	-
PC15. Ensure hardware designs meet customer specifications and quality standards.	-	-	-	-
PC16. Work with the quality assurance team to identify and resolve defects.	-	-	-	-
PC17. Maintain proper documentation of designs, revisions, and test results.	-	-	-	-
NOS Total	**40**	**60**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N8708
NOS Name	Ensuring Product Excellence and Collaboration
Sector	Electronics
Sub-Sector	
Occupation	Research and Design-PCB
NSQF Level	5
Credits	7
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	30/04/2028
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. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

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

5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criterion.

6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

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

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ELE/N8707.Develop and testing of PCB prototype	40	60	-	-	100	30
ELE/N8708.Ensuring Product Excellence and Collaboration	40	60	-	-	100	50
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	20
Total	**100**	**150**	**-**	**-**	**250**	**100**

Acronyms

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

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.
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 Standard	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 (K	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 (G	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today world. These skills are typically needed in any work environment in today 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.