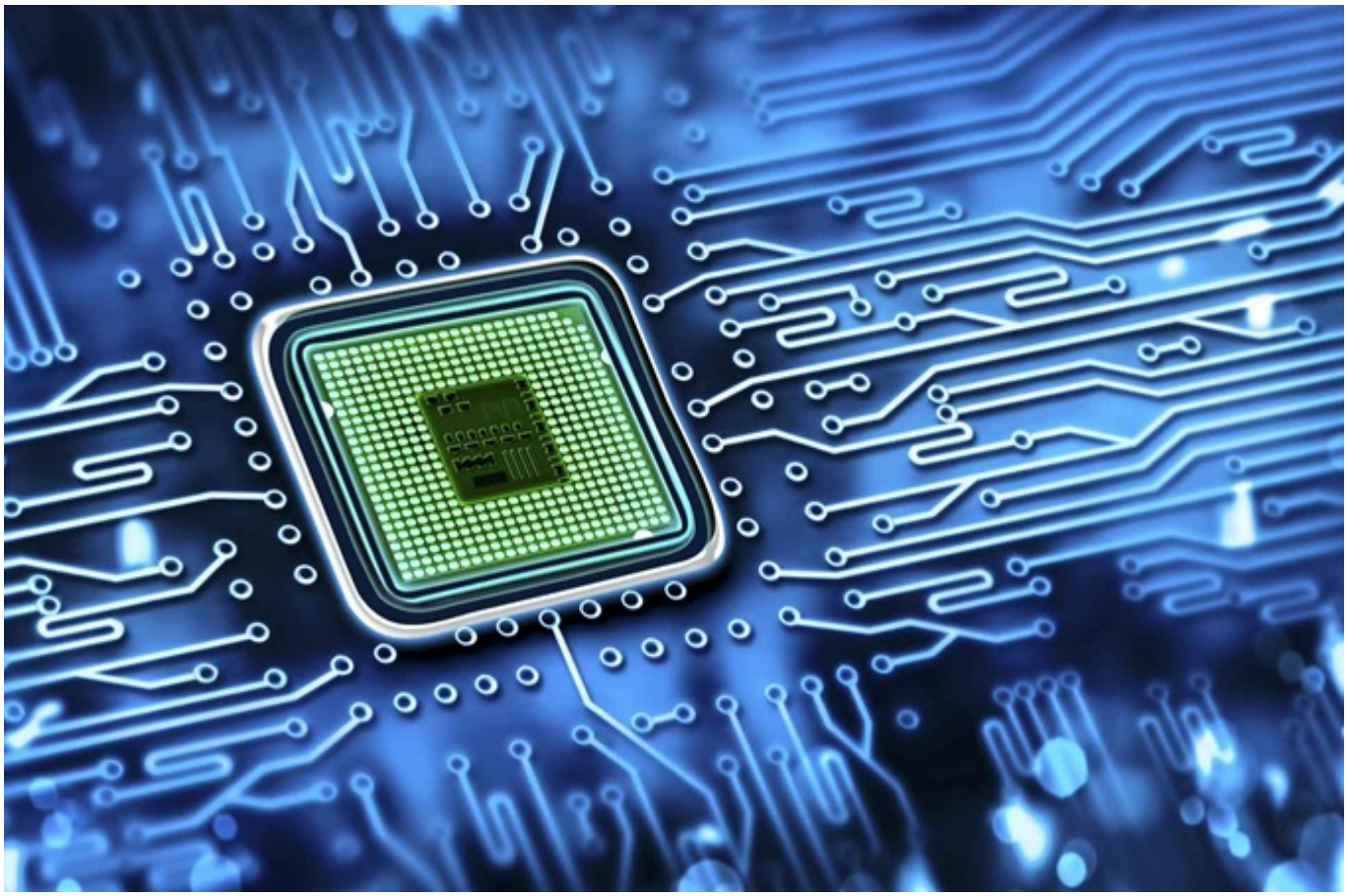
Qualification Pack



Embedded Product Design - Technical Lead

QP Code: ELE/Q1403

Version: 4.0

NSQF Level: 5.5

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House Okhla Industrial Area-Phase 3
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ELE/Q1403: Embedded Product Design - Technical Lead

Brief Job Description

The Embedded Product Design Engineer-Technical Lead designs, develops and debugs embedded systems and related products as per the given requirements, specifications, system architecture and feasibility analysis. The individual leads and performs the assigned responsibilities independently.

Personal Attributes

Must exhibit good customer service attributescourteous, solution-oriented, polite, reliable, good decision-making skills, etc. Must be focused on quality outcomes and possess an analytical bent of mind. Should be responsible for own outcomes and be able to interface and interact with multiple teams (H/customer Unit, Systems, third-party vendors, etc.)

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ELE/N1432: Create Designs for Embedded Electronic product
2. ELE/N1433: Develop, Debug, and Verify Software for Embedded Products
3. ELE/N1434: Perform testing and rectify malfunctions in the prototype of the embedded product
4. 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	5.5
Credits	20
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2512.0501

Minimum Educational Qualification & Experience	Completed 4 year UG program ((Physics/Electronics/Electrical/ Computer Science/Mechanical) with 1.5 years of experience Relevant Experience in Semiconductor & Components OR Completed 3 year UG degree (Physics/Electronics/Electrical/ Computer Science/Mechanical) with 1.5 years of experience Relevant Experience in Semiconductor & Components OR Completed 3 year diploma after 10th (Electronics/Electrical/ Computer Science/Mechanical) with 3 Years of experience Relevant Experience in Semiconductor & Components OR Previous relevant Qualification of NSQF Level (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	30/04/2028
NSQC Approval Date	08/05/2025
Version	4.0
Reference code on NQR	QG-5.5-EH-03983-2025-V4-ESSCI
NQR Version	4.0

Remarks:

NA

Qualification Pack

ELE/N1432: Create Designs for Embedded Electronic product

Description

This NOS unit is about design, develop, and validate advanced embedded products by integrating AI/ML, IoT, and cybersecurity features using modern tools, design methodologies, and compliance with industry standards.

Scope

The scope covers the following :

- Prepare and develop the design for embedded products
- Use appropriate design techniques
- Perform post design activities

Elements and Performance Criteria

Prepare and develop the design for embedded products

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

PC1. Collect design requirements including IoT integration, cybersecurity considerations, and AI/ML capabilities, from authorize personnel

PC2. Finalize/list the software, hardware and firmware and cloud architecture required for modern embedded systems.

PC3. Conduct feasibility analysis with emphasis on power optimization, edge computing, and scalability of the embedded product.

PC4. Interpret data sheets of components such as AI accelerators and edge processors, to assess operational characteristics

PC5. Compare data of components with emerging technologies like RISC-V processors or ARM Cortex-M series for optimal performance.

PC6. Identify and use tools like MATLAB, TensorFlow Lite, and Zephyr OS for developing new product designs.

PC7. Collaborate with developers on requirements for AI/ML model integration and firmware optimization.

PC8. Ensure selected tools and hardware comply with industry standards for IoT and cybersecurity (e.g., ISO 27001).

PC9. Confirm that licensed software (or open source) are used as per the company standards

PC10. Develop a work plan with agile methodology and DevOps practices for embedded product development.

PC11. Prepare high-level and low-level design document including cloud integration and edge computing frameworks.

Use appropriate design techniques

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

PC12. Apply model-based design techniques using tools like Simulink and LabVIEW for system simulation.

PC13. Confirm that new product design complies with relevant safety standards, performance and budget requirements

PC14. Check to confirm that prototype devices or circuits are built as per required specifications

PC15. Review codes received from the coder to ensure these are in line with the detailed design document requirements

PC16. Perform performance test on the prototype devices/ components as against product specifications and regulatory requirements

PC17. Execute unit-test cases (UTCs) by advanced techniques like hardware-in-the-loop (HIL) testing

PC18. Report problems or issues to appropriate authority in accordance with relevant policy and procedure and seek guidance on how to resolve them

Perform post design activities

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

PC19. Ensure configuration management of hardware items for embedded product

PC20. Create clear and concise hardware specifications, design documentation, hardware- related detailed design documentation, BOMs and parts lists, verification tests and reports

PC21. Review and evaluate supplier/vendor documentation against requirements

PC22. Provide courses of action to management for procurement of all hardware-related components and related services

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Understanding of modern embedded system architecture including IoT, AI/ML, and cloud integration.

KU2. Knowledge of hardware platforms such as RISC-V, ARM Cortex-M, and AI accelerators.

KU3. Proficiency in design tools like MATLAB, TensorFlow Lite, Zephyr OS, Simulink, and LabVIEW.

KU4. Awareness of industry standards and protocols (e.g., ISO 27001) for cybersecurity and IoT compliance.

KU5. Familiarity with Agile and DevOps practices in embedded product development.

KU6. Understanding of model-based and hardware-in-the-loop (HIL) design and testing techniques.

KU7. Knowledge of feasibility analysis focusing on power efficiency, edge computing, and scalability.

KU8. Skill in preparing technical documentation including design specs, BOMs, and verification reports.

KU9. Awareness of configuration management principles for hardware components.

Generic Skills (GS)

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

GS1. Analytical skills to assess component datasheets and perform design comparisons.

GS2. Collaboration skills to work with developers and stakeholders on embedded system requirements.

GS3. Planning and organization to create detailed work plans using Agile methodology.

GS4. Attention to detail when reviewing code and verifying performance against specifications.

GS5. Problem-solving to identify design flaws and provide corrective actions.

GS6. Communication skills to report issues, document designs, and interact with vendors.

GS7. Time management to align design tasks with development timelines and milestones.

GS8. Adaptability to integrate emerging technologies and tools into the design process.

GS9. Quality orientation to ensure compliance with safety and regulatory standards.

GS10. Decision-making to recommend procurement strategies and select optimal design tools.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare and develop the design for embedded products	**18**	**20**	**-**	**4**
PC1. Collect design requirements including IoT integration, cybersecurity considerations, and AI/ML capabilities, from authorize personnel	-	-	-	-
PC2. Finalize/list the software, hardware and firmware and cloud architecture required for modern embedded systems.	-	-	-	-
PC3. Conduct feasibility analysis with emphasis on power optimization, edge computing, and scalability of the embedded product.	-	-	-	-
PC4. Interpret data sheets of components such as AI accelerators and edge processors, to assess operational characteristics	-	-	-	-
PC5. Compare data of components with emerging technologies like RISC-V processors or ARM Cortex-M series for optimal performance.	-	-	-	-
PC6. Identify and use tools like MATLAB, TensorFlow Lite, and Zephyr OS for developing new product designs.	-	-	-	-
PC7. Collaborate with developers on requirements for AI/ML model integration and firmware optimization.	-	-	-	-
PC8. Ensure selected tools and hardware comply with industry standards for IoT and cybersecurity (e.g., ISO 27001).	-	-	-	-
PC9. Confirm that licensed software (or open source) are used as per the company standards	-	-	-	-
PC10. Develop a work plan with agile methodology and DevOps practices for embedded product development.	-	-	-	-
PC11. Prepare high-level and low-level design document including cloud integration and edge computing frameworks.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Use appropriate design techniques	**14**	**17**	**-**	**4**
PC12. Apply model-based design techniques using tools like Simulink and LabVIEW for system simulation.	-	-	-	-
PC13. Confirm that new product design complies with relevant safety standards, performance and budget requirements	-	-	-	-
PC14. Check to confirm that prototype devices or circuits are built as per required specifications	-	-	-	-
PC15. Review codes received from the coder to ensure these are in line with the detailed design document requirements	-	-	-	-
PC16. Perform performance test on the prototype devices/ components as against product specifications and regulatory requirements	-	-	-	-
PC17. Execute unit-test cases (UTCs) by advanced techniques like hardware-in-the-loop (HIL) testing	-	-	-	-
PC18. Report problems or issues to appropriate authority in accordance with relevant policy and procedure and seek guidance on how to resolve them	-	-	-	-
Perform post design activities	**8**	**13**	**-**	**2**
PC19. Ensure configuration management of hardware items for embedded product	-	-	-	-
PC20. Create clear and concise hardware specifications, design documentation, hardware-related detailed design documentation, BOMs and parts lists, verification tests and reports	-	-	-	-
PC21. Review and evaluate supplier/vendor documentation against requirements	-	-	-	-
PC22. Provide courses of action to management for procurement of all hardware-related components and related services	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1432
NOS Name	Create Designs for Embedded Electronic product
Sector	Electronics
Sub-Sector	
Occupation	Product Design-S&C
NSQF Level	5.5
Credits	6
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	30/04/2028
NSQC Clearance Date	08/05/2025

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ELE/N1433: Develop, Debug, and Verify Software for Embedded Products

Description

This NOS unit is about plan, develop, and test embedded software solutions by aligning with design specifications, optimizing microcontroller functions, and ensuring performance through simulation, debugging, and compliance testing.

Scope

The scope covers the following :

- Prepare for embedded product software development based on design documents
- Develop software solutions for embedded products
- Test the software solutions for embedded products

Elements and Performance Criteria

Prepare for embedded product software development based on design documents

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

PC1. Supervise code development work and ensure it is as per high-level design and low-level design, job requirement specifications and in consultations with relevant persons

PC2. Manage activities to meet scheduled timelines in consultation with others involved in the work

PC3. Verify that the appropriate development kit and software based on specified requirements and performance standard

PC4. Plan how to carry out programming efficiently including development of the software solution, its purpose, potential challenges, how to deal with the challenges, which architecture is being used, etc.

PC5. Verify that the appropriate microprocessor or microcontroller for a given task and optimize the embedded design using basic input/ output functions

PC6. Test the setup by compiling and running to check errors in the programs

PC7. Monitor the proposed features and operation of the embedded product e.g. memory organization, peripheral operation, timers, data ports, etc.) and interrupt operation, etc.

PC8. Verify the software requirements specifications for functionality, performance and other considerations

PC9. Ensure correct structure and syntax for developing program specification for target microcontroller function is followed by the coding/development team

PC10. Review the requirements document by using the basis for writing the test plan

PC11. Verify an appropriate embedded product development board and compiler/ development environment for the microcontroller/ processor to be programmed on the development board

Develop software solutions for embedded products

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

PC12. Observe code using timers, data communication ports, analog-to-digital and digital-to-analog converters, and any other embedded product peripherals

PC13. Verify an existing microprocessor/microcontroller software program to comply with specified function and operating parameters

PC14. Manage field programmable gate arrays and digital signal processors as per design requirement

PC15. Review applications that perform signal processing, data acquisition, event processing, data management, and communication functions as per requirements

PC16. Observe system using real-time embedded operating systems (VxWorks, QNX, etc.)

PC17. Verify that correct syntax and appropriate unit test cases (UTCs) have been used when developing code

PC18. Review codes, UTCs, document results with appropriate people

PC19. Monitor the code and UTCs to fix identified defects

PC20. Review feedback from appropriate people to inform future designs

PC21. Verify correct action for identified defects to inform future designs and test code for approval by appropriate personnel

Test the software solutions for embedded products

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

PC22. Ensure testing procedures to analyze code

PC23. Manage key features of the programming language used to develop and test solutions key features to use of registers, addressing modes, assembler instructions, subroutines and flags, etc.

PC24. Check embedded code to determine root cause of defects and implement corrective action

PC25. Verify problems and bugs in code by applying debugging techniques to ensure specifications are met

PC26. Test the compiled code and embedded product into the memory of the embedded product to see if it is working

PC27. Verify the program execution using assembler/simulator software packages

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Understanding of embedded system software architecture and design documentation (HLD/LLD).

KU2. Knowledge of microcontroller/microprocessor selection and their I/O functionality.

KU3. Familiarity with development kits, compilers, debuggers, and embedded IDEs.

KU4. Awareness of programming languages used in embedded systems such as C, C plus, and assembly.

KU5. Understanding of real-time operating systems like VxWorks and QNX

KU6. Knowledge of peripherals like ADC, DAC, timers, UARTs, and their integration in code.

KU7. Understanding of software requirement specifications and test plan development.

KU8. Familiarity with simulation and debugging tools (e.g., JTAG, simulators, assemblers).

KU9. Ability to manage and validate Unit Test Cases (UTCs) and interpret test results.

KU10. Knowledge of field-programmable gate arrays (FPGAs) and digital signal processors (DSPs).

Generic Skills (GS)

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

GS1. Analytical thinking to debug code and identify root causes of issues.
GS2. Project management to plan development tasks and meet timelines.
GS3. Collaboration with cross-functional teams for requirement gathering and review.
GS4. Attention to detail in code structure, syntax, and documentation.
GS5. Problem-solving to optimize software for performance and functionality.
GS6. Time management for efficient scheduling and tracking of software development.
GS7. Effective communication to convey development progress and technical issues.
GS8. Adaptability to work with new tools, boards, and processor architectures.
GS9. Commitment to quality assurance and regulatory compliance in software design.
GS10. Continuous learning to keep pace with evolving embedded technologies.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for embedded product software development based on design documents	**15**	**20**	**-**	**4**
PC1. Supervise code development work and ensure it is as per high-level design and low-level design, job requirement specifications and in consultations with relevant persons	-	-	-	-
PC2. Manage activities to meet scheduled timelines in consultation with others involved in the work	-	-	-	-
PC3. Verify that the appropriate development kit and software based on specified requirements and performance standard	-	-	-	-
PC4. Plan how to carry out programming efficiently including development of the software solution, its purpose, potential challenges, how to deal with the challenges, which architecture is being used, etc.	-	-	-	-
PC5. Verify that the appropriate microprocessor or microcontroller for a given task and optimize the embedded design using basic input/ output functions	-	-	-	-
PC6. Test the setup by compiling and running to check errors in the programs	-	-	-	-
PC7. Monitor the proposed features and operation of the embedded product e.g. memory organization, peripheral operation, timers, data ports, etc.) and interrupt operation, etc.	-	-	-	-
PC8. Verify the software requirements specifications for functionality, performance and other considerations	-	-	-	-
PC9. Ensure correct structure and syntax for developing program specification for target microcontroller function is followed by the coding/development team	-	-	-	-
PC10. Review the requirements document by using the basis for writing the test plan	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Verify an appropriate embedded product development board and compiler/ development environment for the microcontroller/ processor to be programmed on the development board	-	-	-	-
Develop software solutions for embedded products	**15**	**16**	**-**	**3**
PC12. Observe code using timers, data communication ports, analog-to-digital and digital-to-analog converters, and any other embedded product peripherals	-	-	-	-
PC13. Verify an existing microprocessor/microcontroller software program to comply with specified function and operating parameters	-	-	-	-
PC14. Manage field programmable gate arrays and digital signal processors as per design requirement	-	-	-	-
PC15. Review applications that perform signal processing, data acquisition, event processing, data management, and communication functions as per requirements	-	-	-	-
PC16. Observe system using real-time embedded operating systems (VxWorks, QNX, etc.)	-	-	-	-
PC17. Verify that correct syntax and appropriate unit test cases (UTCs) have been used when developing code	-	-	-	-
PC18. Review codes, UTCs, document results with appropriate people	-	-	-	-
PC19. Monitor the code and UTCs to fix identified defects	-	-	-	-
PC20. Review feedback from appropriate people to inform future designs	-	-	-	-
PC21. Verify correct action for identified defects to inform future designs and test code for approval by appropriate personnel	-	-	-	-
Test the software solutions for embedded products	**10**	**14**	**-**	**3**
PC22. Ensure testing procedures to analyze code	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC23. Manage key features of the programming language used to develop and test solutions key features to use of registers, addressing modes, assembler instructions, subroutines and flags, etc.	-	-	-	-
PC24. Check embedded code to determine root cause of defects and implement corrective action	-	-	-	-
PC25. Verify problems and bugs in code by applying debugging techniques to ensure specifications are met	-	-	-	-
PC26. Test the compiled code and embedded product into the memory of the embedded product to see if it is working	-	-	-	-
PC27. Verify the program execution using assembler/simulator software packages	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1433
NOS Name	Develop, Debug, and Verify Software for Embedded Products
Sector	Electronics
Sub-Sector	
Occupation	Product Design-S&C
NSQF Level	5.5
Credits	6
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	30/04/2028
NSQC Clearance Date	08/05/2025

ELE/N1434: Perform testing and rectify malfunctions in the prototype of the embedded product

Description

This NOS unit is about test and troubleshoot embedded product prototypes by verifying performance, identifying malfunctions, and implementing corrective actions to ensure compliance with quality and design standards.

Scope

The scope covers the following :

- Test the prototype of the embedded product
- Rectify malfunction, if any, in the prototype

Elements and Performance Criteria

Test the prototype of the embedded product

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

PC1. Verify the constructed prototype devices/components using appropriate software, hardware and testing methods

PC2. Test the prototype devices/ components using approved procedures that operational requirements are met

PC3. Test unit failures and develop corrective actions to identify the problem in coordination with work with the test/ QA team

Rectify malfunction, if any, in the prototype

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

PC4. Review and debug the constructed prototype devices/components using appropriate software, hardware

PC5. Check compliance with quality standards to provide correct techniques to rectify malfunctions as per standard operating procedures

PC6. Review component change notifications and sourcing alternate components

PC7. Guide the completed new product design work appropriately and submit to relevant authority/ person for approval

PC8. Verify rectification and ensure product is fine

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Principles of embedded systems design and functionality of prototype components.

KU2. Testing methodologies and standards for embedded systems.

KU3. Software and hardware debugging tools (e.g., logic analyzers, oscilloscopes, simulators).

KU4. Common embedded communication protocols (e.g., SPI, I2C, UART).

KU5. Quality assurance procedures and regulatory compliance standards.
KU6. Root cause analysis techniques for diagnosing system failures.
KU7. Standard operating procedures (SOPs) for rectifying malfunctions.
KU8. Component datasheets and change notifications handling.
KU9. Corrective and preventive action planning (CAPA) in testing environments.
KU10. Reporting protocols and documentation for prototype verification and approvals.

Generic Skills (GS)

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

GS1. Analytical thinking to troubleshoot hardware and software issues in prototypes.
GS2. Attention to detail in reviewing test results and identifying malfunctions.
GS3. Problem-solving skills to propose effective corrective actions.
GS4. Collaboration with QA and development teams for coordinated issue resolution.
GS5. Time management to ensure timely debugging and rectification.
GS6. Effective communication to report test findings and escalate issues when needed.
GS7. Adaptability to source and validate alternate components when necessary.
GS8. Technical documentation skills for maintaining design and rectification records.
GS9. Decision-making skills when submitting finalized products for approval.
GS10. Compliance awareness to ensure all procedures align with industry standards and internal policies.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Test the prototype of the embedded product	**15**	**24**	**-**	**3**
PC1. Verify the constructed prototype devices/components using appropriate software, hardware and testing methods	-	-	-	-
PC2. Test the prototype devices/ components using approved procedures that operational requirements are met	-	-	-	-
PC3. Test unit failures and develop corrective actions to identify the problem in coordination with work with the test/ QA team	-	-	-	-
Rectify malfunction, if any, in the prototype	**25**	**26**	**-**	**7**
PC4. Review and debug the constructed prototype devices/components using appropriate software, hardware	-	-	-	-
PC5. Check compliance with quality standards to provide correct techniques to rectify malfunctions as per standard operating procedures	-	-	-	-
PC6. Review component change notifications and sourcing alternate components	-	-	-	-
PC7. Guide the completed new product design work appropriately and submit to relevant authority/ person for approval	-	-	-	-
PC8. Verify rectification and ensure product is fine	-	-	-	-
NOS Total	**40**	**50**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1434
NOS Name	Perform testing and rectify malfunctions in the prototype of the embedded product
Sector	Electronics
Sub-Sector	
Occupation	Product Design-S&C
NSQF Level	5.5
Credits	6
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	30/04/2028
NSQC Clearance Date	08/05/2025

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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 Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.

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

3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

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

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

6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.

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

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/N1432.Create Designs for Embedded Electronic product	40	50	0	10	100	30
ELE/N1433.Develop, Debug, and Verify Software for Embedded Products	40	50	0	10	100	30
ELE/N1434.Perform testing and rectify malfunctions in the prototype of the embedded product	40	50	0	10	100	30
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	10
Total	**140**	**180**	**-**	**30**	**350**	**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.