

Qualification Pack



Embedded Product Design Engineer- Technical Lead

QP Code: ELE/Q1403

Version: 3.0

NSQF Level: 6

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ELE/Q1403: Embedded Product Design Engineer-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 attributes: courteous, 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/N1403: Design embedded electronic products](#)
- [2. ELE/N1404: Develop and test software solutions for embedded products](#)
- [3. ELE/N1405: Test and rectify malfunctions in the prototype of the embedded product](#)
- [4. ELE/N1002: Apply health and safety practices at the workplace](#)
- [5. DGT/VSQ/N0102: Employability Skills \(60 Hours\)](#)

Qualification Pack (QP) Parameters

Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Design
Country	India
NSQF Level	6
Credits	30
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2512.0501

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Minimum Educational Qualification & Experience	<p>12th grade Pass with 4 Years of experience relevant experience</p> <p>OR</p> <p>12th grade pass with 2 year NTC/ CITS/NAC with 2 Years of experience relevant experience</p> <p>OR</p> <p>Completed 2nd year diploma after 12th with 2 Years of experience relevant experience</p> <p>OR</p> <p>Completed 3 year UG degree with 1 Year of experience relevant experience</p> <p>OR</p> <p>Previous relevant Qualification of NSQF Level (level 5) with 3 Years of experience relevant experience</p>
Minimum Level of Education for Training in School	12th Class
Pre-Requisite License or Training	NA
Minimum Job Entry Age	21 Years
Last Reviewed On	NA
Next Review Date	03/05/2026
NSQC Approval Date	03/05/2023
Version	3.0
Reference code on NQR	QG-06-EH-00422-2023-V1.1-ESSC
NQR Version	1.0



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ELE/N1403: Design embedded electronic products

Description

This unit covers the skills and knowledge required for an embedded product designer (Lead) to develop/debug Embedded products-based products/ features using embedded product designing techniques.

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 and related documents for the product from authorize personnel
- PC2.** collate the requirements and specifications to finalize/list the software, hardware and firmware including system architecture
- PC3.** conduct a feasibility analysis of the proposed embedded product design and evaluate the required parameters
- PC4.** interpret data sheets of components to be used in the system to determine factors that might affect its operational characteristics
- PC5.** compare data of components and its impact with similar or competing vendor products to select fit-for-purpose components
- PC6.** identify and use tools, hardware testing devices, operating system and programming languages required for developing the new product design
- PC7.** work with the developers on coding requirements
- PC8.** ensure that the selected tools and hardware are calibrated as per approved methods and ready for use
- PC9.** confirm that licensed software (or open source) are used as per the company standards
- PC10.** develop a work plan with agreed scheduled timelines in coordination with relevant stakeholders
- PC11.** prepare high-level and low-level design document (detailed design document) accurately, as per requirements

Use appropriate design techniques

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

- PC12.** use approved techniques to design the embedded product as per stipulated quality standards and compliances
- 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

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- 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 white box testing method
- 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.** relevant legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions
- KU2.** relevant health and safety requirements applicable in the workplace
- KU3.** own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities
- KU4.** reporting structure, inter-dependent functions, lines and procedures in the work area
- KU5.** how to engage with specialists for support in order to resolve incidents and service requests
- KU6.** importance of working in clean and safe environmental practices and procedures
- KU7.** relevant people and their responsibilities within the work area
- KU8.** escalation matrix and procedures for reporting work and employment related issues
- KU9.** principles of electrical and electronics
- KU10.** different kinds of hardware and their uses
- KU11.** various types of languages and their uses
- KU12.** various types of operating system and their uses
- KU13.** a basic concept of digital & analog in electronics
- KU14.** earth resistance and earth neutral voltage
- KU15.** various categories of embedded product designs
- KU16.** use of terminology, unit, graphical representation, signs and symbols related to embedded product designing
- KU17.** how to make a feasibility report on new product
- KU18.** fundamentals of new product designing
- KU19.** processes involved in embedded product designing



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- KU20.** use and interpret information from resources and job specification documents Resources: drawings, circuit and physical layouts, charts, customers specifications, graphical electronic/ electrical symbols and standard soldering regulations
- KU21.** how to read a printed circuit board (PCB)
- KU22.** a range of processors used Range: GPP, ASSP, ASIP etc.
- KU23.** principles of board designing
- KU24.** importance and uses of device driver
- KU25.** verification or validation processes involved in embedded product designing
- KU26.** precautionary measures used to protect against electrostatic discharge (ESD)
- KU27.** device standard operating procedures (SOP) and their application
- KU28.** documenting work completion report accurately with required information in logbook, report sheets, etc. as per organizational standard policies

Generic Skills (GS)

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

- GS1.** prepare detailed documentation in appropriate forms and formats including activity logs, attendance sheets, etc.
- GS2.** document details of components, system drawings, structural designs, etc. in required format issued by the organization
- GS3.** write digital communications to clients/ contractors/ staffs within the scope of work
- GS4.** record status of work, file completion report, submit escalations to superiors wherever necessary in accordance with organizations policies
- GS5.** read and comprehend information correctly from various job specification documents, manufacturers manuals, health and safety instructions, memos, etc. applicable to the job in English
- GS6.** read and comprehend possible design errors through calculations and analysis
- GS7.** read and comprehend regulations, policies and legislation pertaining to semiconductors and active components
- GS8.** check and clarify task-related information with relevant authority
- GS9.** communicate effectively with contractors/clients/coordinates to resolve issues related to work wherever necessary
- GS10.** liaise with appropriate authorities using correct communication protocol
- GS11.** communicate with contractors/clients in respectful form and manner in line with organizational protocol
- GS12.** convey and share technical information clearly using appropriate language
- GS13.** evaluate the adequacy of information while determining appropriate product design
- GS14.** identify actual customers product requirements and design product that meets technological feasibility and budget
- GS15.** prepare/modify work plan to overcome unforeseen difficulties or developments that could hamper work outcome
- GS16.** refer complex problems/ issues to relevant authority as per laid down escalation protocol for situations beyond ones scope of work



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- GS17.** plan prioritize and sequence work operations as per job requirements
- GS18.** organize and analyse information relevant to work
- GS19.** manage the required stock of spares and work tools
- GS20.** assess clients product requirements effectively and deliver design specifications that meet the needs
- GS21.** maintain a professional relationship with clients
- GS22.** provide the client with appropriate information and services within acceptable timeframes
- GS23.** offer options beneficial to the customer and inform the range of feasible plans
- GS24.** identify problems with work planning, procedures, output and behavior and their implications
- GS25.** prioritize and plan for problem-solving
- GS26.** communicate problems appropriately to others
- GS27.** identify sources of information and support for problem-solving
- GS28.** seek assistance and support from relevant sources to solve problems
- GS29.** identify effective resolution techniques
- GS30.** select and apply resolution techniques
- GS31.** seek evidence for problem resolution
- GS32.** analyse trends of previous performances/ data to derive the best possible approach to impending problems/issues
- GS33.** analyse risks to minimize losses or damages
- GS34.** complement product research and development with technical inputs deduced from analysis of work data
- GS35.** apply logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
- GS36.** ensure appropriate sizing of the system by selecting appropriate components, incorporating appropriate storage, electrical and mechanical design

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare and develop the design for embedded products</i>	26	30	-	5
PC1. collect design requirements and related documents for the product from authorize personnel	2	3	-	1
PC2. collate the requirements and specifications to finalize/list the software, hardware and firmware including system architecture	4	2	-	-
PC3. conduct a feasibility analysis of the proposed embedded product design and evaluate the required parameters	2	3	-	-
PC4. interpret data sheets of components to be used in the system to determine factors that might affect its operational characteristics	2	2	-	1
PC5. compare data of components and its impact with similar or competing vendor products to select fit-for-purpose components	2	4	-	1
PC6. identify and use tools, hardware testing devices, operating system and programming languages required for developing the new product design	4	3	-	-
PC7. work with the developers on coding requirements	2	3	-	1
PC8. ensure that the selected tools and hardware are calibrated as per approved methods and ready for use	2	2	-	1
PC9. confirm that licensed software (or open source) are used as per the company standards	2	3	-	-
PC10. develop a work plan with agreed scheduled timelines in coordination with relevant stakeholders	2	2	-	-
PC11. prepare high-level and low-level design document (detailed design document) accurately, as per requirements	2	3	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Use appropriate design techniques</i>	7	12	-	3
PC12. use approved techniques to design the embedded product as per stipulated quality standards and compliances	1	4	-	1
PC13. confirm that new product design complies with relevant safety standards, performance and budget requirements	1	2	-	1
PC14. check to confirm that prototype devices or circuits are built as per required specifications	1	2	-	1
PC15. review codes received from the coder to ensure these are in line with the detailed design document requirements	1	1	-	-
PC16. perform performance test on the prototype devices/ components as against product specifications and regulatory requirements	1	1	-	-
PC17. execute unit-test cases (UTCs) by white box testing method	1	1	-	-
PC18. report problems or issues to appropriate authority in accordance with relevant policy and procedure and seek guidance on how to resolve them	1	1	-	-
<i>Perform post design activities</i>	7	8	-	2
PC19. ensure configuration management of hardware items for embedded product	2	2	-	1
PC20. create clear and concise hardware specifications, design documentation, hardware-related detailed design documentation, BOMs and parts lists, verification tests and reports	2	2	-	1
PC21. review and evaluate supplier/vendor documentation against requirements	2	2	-	-
PC22. provide courses of action to management for procurement of all hardware-related components and related services	1	2	-	-
NOS Total	40	50	-	10



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National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1403
NOS Name	Design embedded electronic products
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Design
NSQF Level	6
Credits	TBD
Version	2.0
Last Reviewed Date	27/01/2022
Next Review Date	03/05/2026
NSQC Clearance Date	03/05/2023

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ELE/N1404: Develop and test software solutions for embedded products

Description

This unit covers the skills and knowledge required to develop/debug software solution for embedded products based on the specifications provided in the design document.

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

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- 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.** relevant legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions
- KU2.** relevant health and safety requirements applicable in the workplace
- KU3.** own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities
- KU4.** reporting structure, inter-dependent functions, lines and procedures in the work area
- KU5.** how to engage with specialists for support in order to resolve incidents and service requests
- KU6.** importance of working in clean and safe environmental practices and procedures
- KU7.** relevant people and their responsibilities within the work area
- KU8.** escalation matrix and procedures for reporting work and employment related issues
- KU9.** how to interpret and follow different design specifications, including High- Level Design (HLD) and Low-level Design (LLD)

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- KU10.** Software Development Life Cycle (SDLC)
- KU11.** syntax and semantics of the c language for embedded programming
- KU12.** principles of embedded software programming and real-time programming
- KU13.** how to access memory-mapped peripherals using
- KU14.** how to write interrupt handlers in c
- KU15.** basics of real-time operating systems and scheduling
- KU16.** basics of low power software design
- KU17.** best practices for embedded programming
- KU18.** concepts like sampling, aliasing, filtering, time series and spectral domain
- KU19.** coding standards
- KU20.** types of programming language and platforms for developing software code for embedded products
- KU21.** basic tools of editor, compiler and configuration management
- KU22.** process for converting technical specifications into code
- KU23.** current practice in the infrastructure design of software code
- KU24.** relevant communication protocols e.g. Modbus, Ethernet/ TCP-IP or HART protocol, OPC, Wireless HART
- KU25.** memory architectures, databases and structures
- KU26.** What is field-programmable gate array (FPGA) firmware code development
- KU27.** basics of software configuration management tools
- KU28.** how to write software code that is efficient, readable and maintainable
- KU29.** the range of code generation tools and unit testing tools used to develop software code
- KU30.** how to use coding tools
- KU31.** how to create, review and execute (unit test cases) utcs
- KU32.** how to determine whether components are suitable for re use
- KU33.** different sources of information for help to write software code
- KU34.** different types of problems and defects that may occur and how these may be resolved
- KU35.** how recording corrective actions for problems and defects can improve future designs
- KU36.** how to test and debug new software code
- KU37.** defect tracking tools
- KU38.** software debugging tools; emulators, debuggers, etc.

Generic Skills (GS)

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

- GS1.** prepare detailed documentation and submittals, etc. in appropriate forms, activity logs, attendance sheets
- GS2.** document details of components, system drawings, structural designs, etc. in required format issued by the organization
- GS3.** write electronic mail communications with clients/ contractors/ staffs regarding the scope of work



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- GS4.** record status of work, file completion report, submit escalations to superiors wherever necessary in accordance with organizations policies
- GS5.** read and comprehend information correctly from various job specification documents, manufacturers manuals, health and safety instructions, memos, etc. applicable to the job in English
- GS6.** read and comprehend possible design errors through calculations and analysis
- GS7.** read and comprehend regulations, policies and legislation pertaining to semiconductors and active components
- GS8.** check and clarify task-related information with relevant authority
- GS9.** communicate effectively with contractors/clients/coordinates to resolve issues related to work wherever necessary
- GS10.** liaise with appropriate authorities using correct protocol
- GS11.** communicate with contractors/clients in respectful form and manner in line with organizational protocol
- GS12.** convey and share technical information clearly using appropriate language
- GS13.** evaluate adequacy of information while determining appropriate product design
- GS14.** identify actual customers product requirements and design product that meets technological feasibility and budget
- GS15.** prepare/ modify work plan to overcome unforeseen difficulties or developments that could hamper work outcome
- GS16.** refer complex problems/issues to relevant authority as per laid down escalation protocol for situations beyond ones scope of work
- GS17.** plan, prioritize and sequence work operations as per job requirements
- GS18.** organize and analyse information relevant to work
- GS19.** manage the required stock of spares and work tools
- GS20.** assess clients product requirements effectively and deliver design specifications that meet the needs
- GS21.** maintain a professional relationship with clients
- GS22.** provide the client with appropriate information and services
- GS23.** offer options beneficial to the customer and inform a range of feasible plans

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for embedded product software development based on design documents</i>	18	21	-	6
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:	2	2	-	1
PC2. manage activities to meet scheduled timelines in consultation with others involved in the work	2	3	-	1
PC3. verify that the appropriate development kit and software based on specified requirements and performance standard	2	2	-	1
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.	2	2	-	-
PC5. verify that the appropriate microprocessor or microcontroller for a given task and optimize the embedded design using basic input/ output functions	1	2	-	1
PC6. test the setup by compiling and running to check errors in the programs	1	2	-	1
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.	2	1	-	1
PC8. verify the software requirements specifications for functionality, performance and other considerations	2	2	-	-
PC9. ensure correct structure and syntax for developing program specification for target microcontroller function is followed by the coding/development team	1	1	-	-
PC10. review the requirements document by using the basis for writing the test plan	2	2	-	-

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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	1	2	-	-
<i>Develop software solutions for embedded products</i>	15	20	-	4
PC12. observe code using timers, data communication ports, analog-to-digital and digital-to-analog converters, and any other embedded product peripherals	2	2	-	1
PC13. verify an existing microprocessor/microcontroller software program to comply with specified function and operating parameters	2	2	-	-
PC14. manage field programmable gate arrays and digital signal processors as per design requirement	2	2	-	1
PC15. review applications that perform signal processing, data acquisition, event processing, data management, and communication functions as per requirements	2	2	-	1
PC16. observe system using real-time embedded operating systems (VxWorks, QNX, etc.)	2	2	-	1
PC17. Verify that correct syntax and appropriate unit test cases (UTCs) have been used when developing code	1	2	-	-
PC18. review codes, UTCs, document results with appropriate people	1	2	-	-
PC19. monitor the code and UTCs to fix identified defects	1	2	-	-
PC20. review feedback from appropriate people to inform future designs	1	2	-	-
PC21. verify correct action for identified defects to inform future designs and test code for approval by appropriate personnel	1	2	-	-
<i>Test the software solutions for embedded products</i>	7	9	-	-
PC22. ensure testing procedures to analyze code	2	2	-	-

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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.	1	2	-	-
PC24. check embedded code to determine root cause of defects and implement corrective action	1	1	-	-
PC25. verify problems and bugs in code by applying debugging techniques to ensure specifications are met	1	1	-	-
PC26. test the compiled code and embedded product into the memory of the embedded product to see if it is working	1	1	-	-
PC27. verify the program execution using assembler/simulator software packages	1	2	-	-
NOS Total	40	50	-	10



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National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1404
NOS Name	Develop and test software solutions for embedded products
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Design
NSQF Level	6
Credits	TBD
Version	2.0
Last Reviewed Date	27/01/2022
Next Review Date	03/05/2026
NSQC Clearance Date	03/05/2023

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ELE/N1405: Test and rectify malfunctions in the prototype of the embedded product

Description

This unit covers the testing of the functioning of the prototype and rectifying malfunctions if any.

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.** relevant legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions
- KU2.** relevant health and safety requirements applicable in the workplace
- KU3.** own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities
- KU4.** reporting structure, inter-dependent functions, lines and procedures in the work area

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- KU5.** software and hardware used to test malfunctions
- KU6.** types of tools, hardware and software, and testing devices used
- KU7.** approved techniques used to check defects/ malfunctions
- KU8.** application of debugging and methods used
- KU9.** electromagnetic interference or compatibility (emi/ emc) testing and techniques used

Generic Skills (GS)

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

- GS1.** fill up appropriate forms, activity logs, attendance sheets as per organizational format in English and/ or local language
- GS2.** write basic accident or incident report as witnessed in an appropriate format to the relevant authority
- GS3.** read/ listen and interpret information correctly from relevant instruction documents, manuals, health and safety instructions, memos, etc. applicable to the job in English and/ or local language
- GS4.** read relevant signages, warnings, labels or descriptions on equipment, etc. while carrying out work activities
- GS5.** convey and share technical information clearly using appropriate language
- GS6.** check and clarify task-related information
- GS7.** liaise with appropriate authorities using correct protocol
- GS8.** communicate with people in respectful form and manner in line with organizational protocol
- GS9.** seek clarification from immediate supervisor or responsible authority on how to secure safety at work when faced with difficult decisions
- GS10.** exercise most appropriate solutions to safety breaches at work
- GS11.** plan, prioritize and sequence work operations as per job requirements
- GS12.** organize and analyse information relevant to work
- GS13.** identify problems with work planning, procedures, output and behavior and their implications
- GS14.** prioritize and plan for problem-solving
- GS15.** communicate problems appropriately to others
- GS16.** identify sources of information and support for problem-solving
- GS17.** seek assistance and support from other sources to solve problems
- GS18.** identify effective resolution techniques
- GS19.** select and apply resolution techniques
- GS20.** seek evidence for problem resolution
- GS21.** infer records of past incidents, emergencies, etc. to establish strengths and weaknesses of alternative solutions, conclusions or approaches to safety problems
- GS22.** use reasoning ability to determine possible solutions to potential dangers or insecurity in the workplace

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Test the prototype of the embedded product</i>	12	16	-	5
PC1. verify the constructed prototype devices/components using appropriate software, hardware and testing methods	4	6	-	2
PC2. test the prototype devices/ components using approved procedures that operational requirements are met	4	5	-	2
PC3. test unit failures and develop corrective actions to identify the problem in coordination with work with the test/ QA team	4	5	-	1
<i>Rectify malfunction, if any, in the prototype</i>	28	34	-	5
PC4. review and debug the constructed prototype devices/components using appropriate software, hardware	6	6	-	1
PC5. check compliance with quality standards to provide correct techniques to rectify malfunctions as per standard operating procedures	6	8	-	1
PC6. review component change notifications and sourcing alternate components	6	6	-	1
PC7. guide the completed new product design work appropriately and submit to relevant authority/ person for approval	4	8	-	1
PC8. verify rectification and ensure product is fine	6	6	-	1
NOS Total	40	50	-	10



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1405
NOS Name	Test and rectify malfunctions in the prototype of the embedded product
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Design
NSQF Level	6
Credits	TBD
Version	2.0
Last Reviewed Date	27/01/2022
Next Review Date	03/05/2026
NSQC Clearance Date	03/05/2023

Qualification Pack

ELE/N1002: Apply health and safety practices at the workplace

Description

This OS unit is about knowledge and practices relating to health, safety and security that candidates need to use in the workplace.

Scope

The scope covers the following :

- Deal with workplace hazards
- Apply fire safety practices
- Follow emergencies, rescue and first-aid procedures
- Effective waste management/recycling practices

Elements and Performance Criteria

Deal with workplace hazards

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

- PC1.** identify job-site hazards and possible causes of accident in the workplace
- PC2.** perform work complying to organizational safe working practices and observing hazard signs displayed on containers, equipment and in various work areas such as inside buildings, in open areas and public spaces, etc.
- PC3.** use appropriate personal protective equipment (PPE) for specific tasks and work conditions, contaminant (concentration w.r.t air) requirements and severity of hazard while conforming to the Indian/International standards
- PC4.** follow standard safety procedures while handling tool/ ,equipment, hazardous substances and while working in hazardous environments
- PC5.** dispose electronic waste (such as toxins; metals such as lead, cadmium, barium; flame retardant plastics, welding slag etc.) as per industry approved techniques
- PC6.** avoid damage of components due to negligence in electrostatic discharge (ESD) procedures
- PC7.** locate general health and safety equipment in the workplace such as fire extinguishers; first aid equipment; safety instruments, clothing and installations (fire exits, exhaust fans)
- PC8.** maintain appropriate posture while handling heavy objects
- PC9.** apply good housekeeping practices at all times

Apply fire safety practices

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

- PC10.** take preventive measures to prevent fire hazards
- PC11.**
 - use appropriate fire extinguishers for different types of fires
 - Types of fires: Class A: e.g. ordinary solid combustibles, such as wood, paper, cloth, plastic, charcoal, etc.; Class B: flammable liquids and gases, such as gasoline, propane, diesel fuel, tar, cooking oil, and similar substances; Class C: e.g. electrical equipment such as appliances, wiring, breaker panels, etc. (These categories of fires become Class A, B, and D fires when the electrical equipment that initiated the fire is no l
- PC12.** exhibit rescue and first-aid techniques in case of fire or electrocution

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Follow emergencies, rescue and first-aid procedures

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

- PC13.** administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning etc.
- PC14.** administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock,
- PC15.** participate regularly in emergency procedures such as raising alarm, safe/efficient, evacuation, correct means of taking shelter and escaping, correct assembly point, roll call, correct return to work
- PC16.** use correct method to move injured people and others during an emergency

Effective waste management/recycling practices

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

- PC17.** identify recyclable and non-recyclable, and hazardous waste generated
- PC18.** segregate waste into different categories
- PC19.** ensure disposal of non-recyclable waste appropriately
- PC20.** deposit non-recyclable and reusable material at identified location
- PC21.** follow processes specified for disposal of hazardous waste

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** importance of working in clean and safe work environment following safety practices and procedures
- KU2.** health and safety roles and responsibilities of relevant personnel within and outside the organisation
- KU3.** key internal and external sources of health and safety information
- KU4.** basic knowledge of electronic devices and related health risks
- KU5.** meaning of hazards and risks
- KU6.** various types of health and safety hazards commonly present in the work environment such as physical hazards, electrical hazards, chemical hazards, fire hazards, equipment related hazards, health hazards, etc.
- KU7.** methods of accident prevention
- KU8.** importance of using protective clothing/equipment while working
- KU9.** general principles for identifying and controlling health and safety risks
- KU10.** main hazards and preventive as well as control measures while working with different types of equipment
- KU11.** importance of carrying out electrical and non-electrical isolation to prevent hazards from loss of machine/system/process control
- KU12.** main hazards and preventive as well as control measures when working with electrical systems or using electrical equipment
- KU13.** forms and classifications of hazardous substances
- KU14.** safe working practices while working at various hazardous sites
- KU15.** prevention and control measures to reduce risks from exposure to hazardous substances

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- KU16.** health effects associated with exposure to noise and vibration and the appropriate control measures
- KU17.** precautionary activities to prevent the fire accident
- KU18.** various causes of fire such as heating of metal, spontaneous ignition, sparking, electrical eating, loose fires (smoking, welding, etc.) chemical fires etc.
- KU19.** techniques of using the different fire extinguishers
- KU20.** different methods and material to extinguish fires
- KU21.** different materials used for extinguishing fire such as sand, water, foam, CO₂, dry powder
- KU22.** rescue techniques used during a fire hazard
- KU23.** various types of safety signs and their meaning
- KU24.** basic first aid treatment relevant to the common work place injuries e.g. shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, poisoning, eye injuries
- KU25.** contents of written accident report
- KU26.** potential injuries and ill health associated with incorrect handling of tools and equipment
- KU27.** safe lifting and carrying practices
- KU28.** potential impact to a person who is moved incorrectly
- KU29.** personal safety, health and dignity issues relating to the movement of a person by others
- KU30.** ESD measures and 5S
- KU31.** efficient utilization and management of material and water
- KU32.** ways to recognize common electrical problems and practices of conserving electricity
- KU33.** usage of different colours of dustbins, categorization of waste into dry, wet, recyclable, nonrecyclable and items of single-use plastics
- KU34.** organization's procedure for minimizing waste
- KU35.** waste management and methods of waste disposal
- KU36.** common sources of pollution and ways to minimize it
- KU37.** names, contact information and location of people responsible for health and safety in the workplace
- KU38.** location of documents and equipment for health and safety compliance/practices in the workplace
- KU39.** safety notices, signs and instructions at workplace

Generic Skills (GS)

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

- GS1.** interpret general health and safety guidelines labels, charts, signages
- GS2.** read operation manuals
- GS3.** write health and safety compliance report
- GS4.** write an accident/incident report in local language or English
- GS5.** provide an emergency or safety incident brief to seniors or relevant authorities in a calm, clear and to-the-point manner
- GS6.** communicate general health and safety guidelines to colleagues/co-workers



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- GS7.** communicate appropriately with co-workers in order to clarify instructions and other issues
- GS8.** act in case of any potential hazards observed in the work place
- GS9.** plan and organize their own work schedule, work area, tools, equipment in compliance with organizational policies for health, safety and security
- GS10.** take adequate measures to ensure the safety of clients and visitors at the workplace
- GS11.** identify immediate or temporary solutions to resolve delays
- GS12.** evaluate the work area for health and safety risks or hazards
- GS13.** use cause and effect relations to anticipate potential issues, problems and their solution in the work area related to safety
- GS14.** recognise emergency and potential emergency situations
- GS15.** protect self and others from a health and safety risk or hazard
- GS16.** communicate and collaborate to incorporate sustainable practices (greening) in workplace processes
- GS17.** record data on waste disposal at workplace

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Deal with workplace hazards</i>	20	31	-	-
PC1. identify job-site hazards and possible causes of accident in the workplace	2	3	-	-
PC2. perform work complying to organizational safe working practices and observing hazard signs displayed on containers, equipment and in various work areas such as inside buildings, in open areas and public spaces, etc.	3	4	-	-
PC3. use appropriate personal protective equipment (PPE) for specific tasks and work conditions, contaminant (concentration w.r.t air) requirements and severity of hazard while conforming to the Indian/International standards	3	4	-	-
PC4. follow standard safety procedures while handling tool/ ,equipment, hazardous substances and while working in hazardous environments	3	4	-	-
PC5. dispose electronic waste (such as toxins; metals such as lead, cadmium, barium; flame retardant plastics, welding slag etc.) as per industry approved techniques	2	4	-	-
PC6. avoid damage of components due to negligence in electrostatic discharge (ESD) procedures	2	3	-	-
PC7. locate general health and safety equipment in the workplace such as fire extinguishers; first aid equipment; safety instruments, clothing and installations (fire exits, exhaust fans)	2	3	-	-
PC8. maintain appropriate posture while handling heavy objects	1	3	-	-
PC9. apply good housekeeping practices at all times	2	3	-	-
<i>Apply fire safety practices</i>	4	9	-	-
PC10. take preventive measures to prevent fire hazards	2	3	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<p>PC11.</p> <ul style="list-style-type: none"> • use appropriate fire extinguishers for different types of fires • Types of fires: Class A: e.g. ordinary solid combustibles, such as wood, paper, cloth, plastic, charcoal, etc.; Class B: flammable liquids and gases, such as gasoline, propane, diesel fuel, tar, cooking oil, and similar substances; Class C: e.g. electrical equipment such as appliances, wiring, breaker panels, etc. (These categories of fires become Class A, B, and D fires when the electrical equipment that initiated the fire is no l 	1	3	-	-
<p>PC12. exhibit rescue and first-aid techniques in case of fire or electrocution</p>	1	3	-	-
<p><i>Follow emergencies, rescue and first-aid procedures</i></p>	6	13	-	-
<p>PC13. administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning etc.</p>	1	3	-	-
<p>PC14. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock,</p>	1	2	-	-
<p>PC15. participate regularly in emergency procedures such as raising alarm, safe/efficient, evacuation, correct means of taking shelter and escaping, correct assembly point, roll call, correct return to work</p>	2	4	-	-
<p>PC16. use correct method to move injured people and others during an emergency</p>	2	4	-	-
<p><i>Effective waste management/recycling practices</i></p>	5	12	-	-
<p>PC17. identify recyclable and non-recyclable, and hazardous waste generated</p>	1	3	-	-
<p>PC18. segregate waste into different categories</p>	1	2	-	-
<p>PC19. ensure disposal of non-recyclable waste appropriately</p>	1	2	-	-
<p>PC20. deposit non-recyclable and reusable material at identified location</p>	1	3	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC21. follow processes specified for disposal of hazardous waste	1	2	-	-
NOS Total	35	65	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1002
NOS Name	Apply health and safety practices at the workplace
Sector	Electronics
Sub-Sector	Generic
Occupation	Generic - Health Safety
NSQF Level	4
Credits	TBD
Version	3.0
Last Reviewed Date	24/02/2022
Next Review Date	03/05/2026
NSQC Clearance Date	03/05/2023



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:

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- 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.

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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



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- 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

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	1	1	-	-
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
<i>Constitutional values - Citizenship</i>	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	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	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	-	-	-	-
<i>Basic English Skills</i>	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	-	-	-	-
<i>Career Development & Goal Setting</i>	1	2	-	-

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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	-	-	-	-
<i>Communication Skills</i>	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	-	-	-	-
<i>Diversity & Inclusion</i>	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	-	-	-	-
<i>Financial and Legal Literacy</i>	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	-	-	-	-
<i>Essential Digital Skills</i>	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	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Entrepreneurship</i>	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	-	-	-	-
<i>Customer Service</i>	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	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	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	-	-

Qualification Pack

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	NA
Next Review Date	27/05/2024
NSQC Clearance Date	27/05/2021

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.

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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/N1403.Design embedded electronic products	40	50	-	10	100	30
ELE/N1404.Develop and test software solutions for embedded products	40	50	-	10	100	30
ELE/N1405.Test and rectify malfunctions in the prototype of the embedded product	40	50	-	10	100	20
ELE/N1002.Apply health and safety practices at the workplace	35	65	-	-	100	10
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	0	0	50	10
Total	175	245	-	30	450	100



Qualification Pack

Acronyms

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

Qualification Pack

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.

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Knowledge and Understanding (KU)	<p>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.</p>
Organisational Context	<p>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.</p>
Technical Knowledge	<p>Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.</p>
Core Skills/ Generic Skills (GS)	<p>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.</p>
Electives	<p>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.</p>
Options	<p>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.</p>