Qualification Pack

Embedded Product Design Engineer-Technical Lead

QP Code: ELE/Q1403

Version: 2.0

NSQF Level: 6

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

Contents

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 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/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/N9905: Work effectively at the workplace
5. ELE/N1002: Apply health and safety practices at the workplace

Qualification Pack (QP) Parameters

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

Minimum Educational Qualification & Experience	Diploma ((after 12th) in relevant trade with 04 years of relevant experience)) OR B.E./B.Tech ((Degree in Electrical or Electronics Engineering) with 02 Year of relevant Experience OR (M.E/M.Tech in Electrical or Electronics Engineering)) OR Certificate-NSQF (Level-5 in Embedded Software Engineer) with 2 Years of experience In the relevant field
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	26 Years
Last Reviewed On	27/01/2022
Next Review Date	02/06/2025
Deactivation Date	31/07/2024
NSQC Approval Date	27/01/2022
Version	2.0
Reference code on NQR	2022/EHW/ESSC/05130
NQR Version	1.0

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 usingembedded 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

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

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

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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare and develop the design for embedded products	**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	-	-
Use appropriate design techniques	**7**	**12**	**-**	**3**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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	-	-
Perform post design activities	**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**

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

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

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)

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
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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for embedded product software development based on design documents	**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	-	-

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	-	-
Develop software solutions for embedded products	**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	-	-
Test the software solutions for embedded products	**7**	**9**	**-**	**-**
PC22. ensure testing procedures to analyze code	2	2	-	-

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**

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

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

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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Test the prototype of the embedded product	**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
Rectify malfunction, if any, in the prototype	**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**

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

ELE/N9905: Work effectively at the workplace

Description

This unit is about the communicating and managing work effectively at the workplace as well as taking measures to enhance own competence and working in a disciplined and ethical manner.

Scope

The scope covers the following :

- Communicate effectively at the workplace
- Work effectively
- Maintain and enhance professional competence
- Work in a disciplined and ethical manner
- Uphold social diversity at the workplace

Elements and Performance Criteria

Communicate effectively at the workplace

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

PC1. exchange information and instruction with colleagues, and seek clarifications and feedback as necessary

PC2. assist colleagues where required

PC3. follow business communication etiquette in all interactions and communicative formats (online, digital, and in-person)

PC4. document and share all relevant information with stakeholders in agreed formats and as per agreed timelines

Work effectively

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

PC5. identify and obtain clarity regarding organisational, team and own goals and targets

PC6. prioritise and plan work in order to achieve goals and targets

PC7. monitor own and team performance as per agreed plan

PC8. complete duties accurately, systematically and within required timeframes

PC9. express emotions appropriately at the workplace and manage own response to heightened emotions

PC10. maintain orderliness and cleanliness in the work area

Maintain and enhance professional competence

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

PC11. identify own strengths and weaknesses in relation to goals and targets

PC12. adapt self, service, or product to meet success criteria

PC13. seek and select opportunities for continuous professional development

PC14. formulate a professional development plan to enhance capabilities

PC15. build or contribute to the organizational knowledge base of cases, clients, issues, solutions, and innovations

PC16. examine developments and trends in field of work and their potential impact on work

PC17. take feedback from peers, supervisors and clients to improve own performance and practices

Work in a disciplined and ethical manner

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

PC18. perform tasks as per workplace standards, organisational policies and legislative requirements

PC19. display appropriate professional appearance at the workplace and adhere to the organisational dress code

PC20. demonstrate responsible and disciplined behaviour at the workplace such as punctuality; completing tasks as per given time and standards; demonstrating professional behaviour at all times, adopting environment- friendly practices, etc.

PC21. identify the cause of conflict and options for resolution with peers or escalate grievances and problems to appropriate authority as per procedure for conflict resolution

PC22. protect the rights of the client and organisation when delivering services

PC23. ensure services are delivered equally to all clients regardless of personal and cultural beliefs

PC24. operate within an agreed ethical code of practice and report unethical conduct to the appropriate authorities

PC25. follow organisational guidelines and legal requirements on disclosure and confidentiality

Uphold social diversity at the workplace

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

PC26. recognize and evaluate biased practices against underrepresented groups like women and persons with disabilities, in workplace systems and processes

PC27. identify and report discrimination and harassment based on gender, disability, or cultural difference at the workplace

PC28. use inclusive or neutral language and gestures in all interactions

PC29. respect the personal and professional space of others

PC30. access grievance redressal mechanisms as per legislations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organisation's policies on dress code, workplace timings, workplace behaviour, performance management, incentives, delivery standards, information security, etc.

KU2. organizational hierarchy and escalation matrix

KU3. importance of the individual's role in the workflow

KU4. organisational norms on health, safety and sustainability

KU5. work area inspection procedures and practices

KU6. professional etiquette and grooming

KU7. communication etiquette across communicative mediums (online, digital, and in-person) including strategies/methods for sharing information, documentation, and providing and receiving feedback

KU8. importance of self-evaluations and developing a continuous learning and professional development plan

KU9. developments and trends impacting professional practice

KU10. importance of taking and using feedback from colleagues and clients to identify and introduce improvements in work performance

KU11. professional ethics and workplace norms on reporting and/or penalizing unethical behaviour and practices.

KU12. guidelines and legal requirements on disclosure, confidentiality, and conflicts of interest

KU13. strategies for collaboration with colleagues and clients.

KU14. professional responses and strategies against inappropriate language or behaviour toward self and others

KU15. Implicit bias (based on gender, disability, class, caste, colour, race, culture, religion, etc.) and its consequences in the workplace

KU16. organizational guidelines, prevalent legislations and accessibility norms and processes to support PwDs at the workplace

KU17. strategies for time, effort and resource allocation towards the goals.

KU18. basic concepts of work productivity including waste reduction, efficient material usage and optimization of time

Generic Skills (GS)

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

GS1. complete documentation and forms such as work orders, invoices maintenance records activity logs, attendance sheets as per organizational format in English and/or local language

GS2. write basic accident or incident report accurately in an appropriate format

GS3. read warnings, instructions and other text material on product labels, components, etc. and relevant signages, warnings, labels or descriptions on equipment, etc. while carrying out work activities

GS4. convey and share technical information clearly using appropriate language

GS5. clarify task-related information

GS6. liaise with authorities and supervisors as per organizational protocol

GS7. listen, speak, and write in an inclusive, respectful manner in line with organizational protocol

GS8. seek clarification from immediate supervisor or responsible authority or exercise most appropriate solutions to safety breaches at work

GS9. report to the supervisor and when to deal with a colleague depending on the type of concern

GS10. deliver product to next work process on time

GS11. improve work process and report potential areas of delays and disruptions

GS12. communicate problems appropriately to others

GS13. identify symptoms of the fault to the cause of the problem and resolve, otherwise seek assistance and support from other sources to solve the problem

GS14. anticipate and avoid hazards that may occur during repairs because of tools, materials used or repair processes

GS15. complete tasks efficiently and accurately within stipulated time

GS16. appreciate and respect social diversity in all professional settings

GS17. develop awareness and accountability for perspectives on gender, disabilities, and socio-cultural issues leading to discrimination, bias, or harassment at the workplace

GS18. maintain positive and effective relationships with colleagues and customers

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Communicate effectively at the workplace	**5**	**13**	**-**	**-**
PC1. exchange information and instruction with colleagues, and seek clarifications and feedback as necessary	1	3	-	-
PC2. assist colleagues where required	1	3	-	-
PC3. follow business communication etiquette in all interactions and communicative formats (online, digital, and in-person)	1	4	-	-
PC4. document and share all relevant information with stakeholders in agreed formats and as per agreed timelines	2	3	-	-
Work effectively	**6**	**13**	**-**	**-**
PC5. identify and obtain clarity regarding organisational, team and own goals and targets	1	2	-	-
PC6. prioritise and plan work in order to achieve goals and targets	1	2	-	-
PC7. monitor own and team performance as per agreed plan	1	2	-	-
PC8. complete duties accurately, systematically and within required timeframes	1	2	-	-
PC9. express emotions appropriately at the workplace and manage own response to heightened emotions	1	2	-	-
PC10. maintain orderliness and cleanliness in the work area	1	3	-	-
Maintain and enhance professional competence	**8**	**7**	**-**	**-**
PC11. identify own strengths and weaknesses in relation to goals and targets	1	1	-	-
PC12. adapt self, service, or product to meet success criteria	1	1	-	-
PC13. seek and select opportunities for continuous professional development	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. formulate a professional development plan to enhance capabilities	2	1	-	-
PC15. build or contribute to the organizational knowledge base of cases, clients, issues, solutions, and innovations	1	1	-	-
PC16. examine developments and trends in field of work and their potential impact on work	1	1	-	-
PC17. take feedback from peers, supervisors and clients to improve own performance and practices	1	1	-	-
Work in a disciplined and ethical manner	**11**	**16**	**-**	**-**
PC18. perform tasks as per workplace standards, organisational policies and legislative requirements	2	2	-	-
PC19. display appropriate professional appearance at the workplace and adhere to the organisational dress code	1	2	-	-
PC20. demonstrate responsible and disciplined behaviour at the workplace such as punctuality; completing tasks as per given time and standards; demonstrating professional behaviour at all times, adopting environment- friendly practices, etc.	1	2	-	-
PC21. identify the cause of conflict and options for resolution with peers or escalate grievances and problems to appropriate authority as per procedure for conflict resolution	2	2	-	-
PC22. protect the rights of the client and organisation when delivering services	1	2	-	-
PC23. ensure services are delivered equally to all clients regardless of personal and cultural beliefs	1	2	-	-
PC24. operate within an agreed ethical code of practice and report unethical conduct to the appropriate authorities	2	2	-	-
PC25. follow organisational guidelines and legal requirements on disclosure and confidentiality	1	2	-	-
Uphold social diversity at the workplace	**10**	**11**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC26. recognize and evaluate biased practices against underrepresented groups like women and persons with disabilities, in workplace systems and processes	2	2	-	-
PC27. identify and report discrimination and harassment based on gender, disability, or cultural difference at the workplace	2	2	-	-
PC28. use inclusive or neutral language and gestures in all interactions	2	2	-	-
PC29. respect the personal and professional space of others	2	2	-	-
PC30. access grievance redressal mechanisms as per legislations	2	3	-	-
NOS Total	**40**	**60**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N9905
NOS Name	Work effectively at the workplace
Sector	Electronics
Sub-Sector	Generic
Occupation	Generic - Organizational Behaviour
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	24/02/2022
Next Review Date	30/12/2026
NSQC Clearance Date	30/12/2021

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

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

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 handing 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
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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Deal with workplace hazards	**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	-	-
Apply fire safety practices	**4**	**9**	**-**	**-**
PC10. take preventive measures to prevent fire hazards	2	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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	1	3	-	-
PC12. exhibit rescue and first-aid techniques in case of fire or electrocution	1	3	-	-
Follow emergencies, rescue and first-aid procedures	**6**	**13**	**-**	**-**
PC13. administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning etc.	1	3	-	-
PC14. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock,	1	2	-	-
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	2	4	-	-
PC16. use correct method to move injured people and others during an emergency	2	4	-	-
Effective waste management/recycling practices	**5**	**12**	**-**	**-**
PC17. identify recyclable and non-recyclable, and hazardous waste generated	1	3	-	-
PC18. segregate waste into different categories	1	2	-	-
PC19. ensure disposal of non-recyclable waste appropriately	1	2	-	-
PC20. deposit non-recyclable and reusable material at identified location	1	3	-	-
PC21. follow processes specified for disposal of hazardous waste	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	**35**	**65**	**-**	**-**

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	24/02/2025
NSQC Clearance Date	24/02/2022

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/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/N9905.Work effectively at the workplace	40	60	-	-	100	10
ELE/N1002.Apply health and safety practices at the workplace	35	65	-	-	100	10
Total	**195**	**275**	**-**	**30**	**500**	**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.