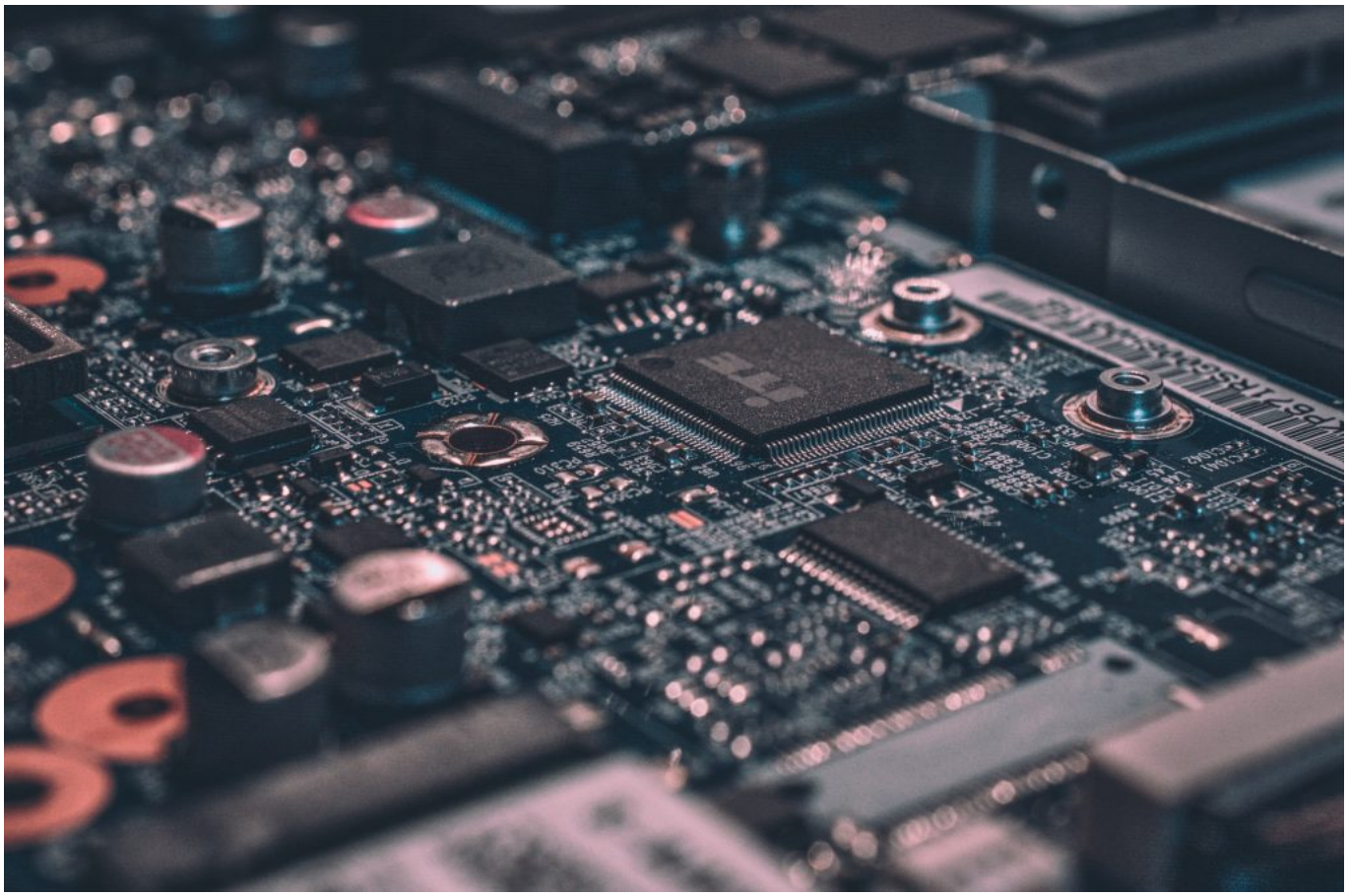
Qualification Pack



IoT Hardware Analyst

QP Code: ELE/Q1405

Version: 3.0

NSQF Level: 5

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ELE/Q1405: IoT Hardware Analyst

Brief Job Description

The individual in this job role prepares a complete blueprint of the hardware including schematics layout, quality verification requirements and perform PCB testing in compliance with regulatory standards to records them in a design document. The individual will also be responsible for working and efficient functioning of the system.

Personal Attributes

The individual must have attention to details, logical thinking, and ability to execute the project as per clients requirement. This job requires the individual to work collaboratively with diverse teams. The individual should be able to hold interest in technology changes, demonstrate strong technical expertise and possess good oral and written communications skills. The individual should also be comfortable working with deadlines and budgets.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ELE/N1407: Create requirement specifications and detailed design documents
2. ELE/N1408: Design circuit and PCB layout for the IoT system
3. ELE/N1409: Build and test the complete IoT system
4. ELE/N1002: Apply health and safety practices at the workplace
5. DGT/VSQ/N0101: Employability Skills (30 Hours)

Qualification Pack (QP) Parameters

Sector	Electronics
Sub-Sector	
Occupation	Product Design
Country	India
NSQF Level	5
Credits	15

Qualification Pack

Aligned to NCO/ISCO/ISIC Code	NCO-2015/2152.0801
Minimum Educational Qualification & Experience	Completed 3 year diploma after 10th (Electrical/Electronics) with 1 Year of experience relevant experience OR 12th grade pass with 1 year NTC/ NAC with 1 Year of experience relevant experience OR 12th grade Pass with 2 Years of experience relevant experience OR Previous relevant Qualification of NSQF Level (4) with 3 Years of experience relevant experience OR 10th grade pass with 4 Years of experience relevant experience
Minimum Level of Education for Training in School	10th Class
Pre-Requisite License or Training	NA
Minimum Job Entry Age	21 Years
Last Reviewed On	NA
Next Review Date	27/01/2025
NSQC Approval Date	27/01/2022
Version	3.0
Reference code on NQR	QG-05-EH-00424-2023-V1.1-ESSC
NQR Version	1.0

Remarks:

NA

Qualification Pack

ELE/N1407: Create requirement specifications and detailed design documents

Description

This OS unit is specifically designed to prepare detailed requirement specifications for the IoT systems and a detail design document that entails the specifications of key components, any dependencies and constraints in the system.

Scope

The scope covers the following :

- Prepare documents highlighting the requirements and system specifications
- Create a detailed design document

Elements and Performance Criteria

Prepare documents highlighting the requirements and system specifications

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

PC1. verify the high-level design and connectivity requirements with the system needs

PC2. ensure that the need and requirement for inter-operability between various connectivity interfaces is maintained

PC3. list the protocols that facilitate the handshakes between different connected devices in the IoT system

PC4. review all the machine-to-machine (M2M) information in flow chart or connected diagrams that show all inputs and outputs of the system

PC5. manage the manufacturing processes involved and the integration requirements of the system to ensure all equipment needed for validation and testing the system is available

PC6. check and list the dependencies of critical stages and any process constraints for the system

PC7. verify that the trigger mechanisms for every component of the system are highlighted and managed properly

PC8. list the safety and security aspects of the system required in all the stages of the design

PC9. ensure that globally accepted regulatory standards for the technical specifications have been considered while listing specifications and system requirements

PC10. supervise the finalization of requirements and specifications along with other determinants required for proper design and development such as parameters to be recorded, specific connectivity need at each interface, etc.

PC11. ensure potential safety requirements have been considered in the analysis phase and customer approval has been received on the requirement specifications

Create a detailed design document

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

PC12. review the functional specifications document of the complete system as well as individual components

PC13. ensure that an alternative design analysis has been prepared which describes all possible options/solutions for the requirements specifications

PC14. verify that the IoT system matches the technical specifications and confirms with the evaluation criteria and appropriate components to be deployed

PC15. ensure that reusable components, relevant best practices and design standards have been used and followed as per the organization's knowledge base

PC16. prepare for the component and human resources requirements from various domains such as chip design (if any), board design, layout designers, connectivity protocol experts, firm ware designers, verification and validation folks, etc.

PC17. check standard tools to simulate, analyse and synthesize design options for electronic circuits

PC18. ensure that the designed system matches quality standards and user requirements

PC19. review strategies used by the designed system for energy efficiency, environmental standards and safety measures

PC20. check noise and electromagnetic interface (EMI) and electromagnetic compatibility (EMC) requirements in electrical and electronic systems

PC21. guide initial assessment of the entire system while outlining the possible delivery output with the client and seek their approval

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. relevant legislation, standards, policies, rules and procedures followed in the company relevant to own employment and performance conditions

KU2. relevant health and safety requirements applicable in the work place

KU3. own job role and responsibilities

KU4. sources for information pertaining to employment terms, entitlements, job role and responsibilities

KU5. reporting structure, inter-department functions, lines and procedures in the work area

KU6. how to engage with experts and vendors for support

KU7. relevant people and their responsibilities within the work area

KU8. documentation and related procedures applicable in the context of the employment and work

KU9. escalation matrix and procedures for reporting work and employment related issues

KU10. safety and cleanliness procedures to be adopted in the workplace

KU11. importance of document preparation, referencing and flow chart preparation

KU12. document control: using organizational document naming and numbering schemes

KU13. use of project management tools like microsoft project and jira

KU14. reading and drawing electronic circuits, process and system flowcharts, project schedules, logic diagram and work breakdown structures (wbs)

KU15. principles of electrical and electronics engineering

KU16. types of sensors and micro- controllers and their accuracy, types, uses and precautions

KU17. concepts of digital electronics, communication protocols and wireless standards like bluetooth, waln, cellular standars like gprs< 3g/4g/5g and narrow-band iot

KU18. frequencies of operation, range, power requirements, modules/chips to support these standards and the related design considerations

KU19. estimation of system power budget

KU20. identification of various sources of power, connection design of power supply system and their use in the iot system

KU21. various iot cloud platforms and build an overall understanding of solution requirements

KU22. noise and emi sources in electronics circuits

KU23. different types of batteries, their size calculation and methods of battery charging

KU24. application of uninterrupted ac power sources, if the system runs on non-mains power

KU25. basics of rf board design, high speed digital design, schematic entry tools, pcb cad tools, pcb power and signal integrity analysis tools

KU26. pcb layout process: defining board stackup, impedance matching requirements, specifying placement and routing guidelines

KU27. importance of any automation plan, project implementation and change management

KU28. applicable standards, regulations, code compliance

KU29. how to ensure the design confirms to safety and environmental standards

Generic Skills (GS)

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

GS1. how to fill up appropriate technical forms, process charts, activity logs as per organizational format in english and/or local language

GS2. methods to capture complete information as required from stakeholders, experts, vendors, etc. accurately and in the required formats

GS3. process of preparation of report summarizing all the relevant information

GS4. use of basic office applications like spread sheet, word processor, presentations

GS5. use of organizational software specific to quality function

GS6. how to write an email to communicate within and outside the organization as per organization guidelines

GS7. how to prepare and create flow charts and use of project planning tools

GS8. how to read/listen and interpret information correctly from various work instruction documents, manuals, health and safety instructions, memos, etc. applicable to the job in english and/or local language

GS9. how to read relevant symbols, labels and descriptions on components and equipment while performing early analysis of design

GS10. methods to gather information in an organized manner such that all relevant information is obtained

GS11. use of probing questions to help the stakeholders provide complete information

GS12. how to convey and share technical information clearly using appropriate business and technical language

GS13. how to check and clarify task-related information

GS14. how to liaise with appropriate authorities using correct protocol

GS15. how to communicate with people following organizational protocols

GS16. how to take inputs from various stakeholders in order to make critical decisions

GS17. methods of evaluating various options, their pros and cons, short term and long-term implications, cost, time and scope implications, health and safety implications, etc.

GS18. process of seeking clarification from responsible authority on how to rectify problems at work

GS19. how to identify limitations and constraints of any components being used in the system

GS20. how to plan, prioritize and sequence the activities to be carried out

GS21. how to organize and analyze information relevant to work

GS22. how to maintain productivity by applying time management, efficient resource utilization and eliminating waste and extra cost in the design

GS23. how to communicate with customers on regular basis updating them on project status, delivery schedules, deviations or variances in any project specifications like schedule, development cost, product cost, feature changes etc.

GS24. how to establish agreed format and timelines for customer mails/ meetings/updates.

GS25. how to establish the format and approach for the integration of the design into the customer system

GS26. methods to generate a structured problem statement and plan for problem solving as per priority

GS27. process of identifying problems with work planning, procedures, output and behavior and their implications

GS28. how to identify sources of information and support for solving a problem

GS29. how to seek assistance and support from relevant authority in case of unresolved problems

GS30. how to apply effective problem resolutions techniques appropriately

GS31. how to monitor effectiveness of problem resolution through appropriate feedback mechanisms

GS32. how to apply logical reasoning to solve problems related to work by analyzing them based on previous experiences

GS33. how to determine the impact of selection of inappropriate work procedures and inputs on overall work outcome

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare documents highlighting the requirements and system specifications	**22**	**26**	**-**	**5**
PC1. verify the high-level design and connectivity requirements with the system needs	2	3	-	1
PC2. ensure that the need and requirement for inter-operability between various connectivity interfaces is maintained	2	2	-	-
PC3. list the protocols that facilitate the handshakes between different connected devices in the IoT system	2	2	-	-
PC4. review all the machine-to-machine (M2M) information in flow chart or connected diagrams that show all inputs and outputs of the system	2	3	-	1
PC5. manage the manufacturing processes involved and the integration requirements of the system to ensure all equipment needed for validation and testing the system is available	2	2	-	1
PC6. check and list the dependencies of critical stages and any process constraints for the system	2	2	-	-
PC7. verify that the trigger mechanisms for every component of the system are highlighted and managed properly	2	2	-	1
PC8. list the safety and security aspects of the system required in all the stages of the design	2	2	-	1
PC9. ensure that globally accepted regulatory standards for the technical specifications have been considered while listing specifications and system requirements	2	3	-	-
PC10. supervise the finalization of requirements and specifications along with other determinants required for proper design and development such as parameters to be recorded, specific connectivity need at each interface, etc.	2	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. ensure potential safety requirements have been considered in the analysis phase and customer approval has been received on the requirement specifications	2	3	-	-
Create a detailed design document	**18**	**24**	**-**	**5**
PC12. review the functional specifications document of the complete system as well as individual components	2	3	-	1
PC13. ensure that an alternative design analysis has been prepared which describes all possible options/solutions for the requirements specifications	2	3	-	1
PC14. verify that the IoT system matches the technical specifications and confirms with the evaluation criteria and appropriate components to be deployed	2	2	-	1
PC15. ensure that reusable components, relevant best practices and design standards have been used and followed as per the organization's knowledge base	2	2	-	-
PC16. prepare for the component and human resources requirements from various domains such as chip design (if any), board design, layout designers, connectivity protocol experts, firm ware designers, verification and validation folks, etc.	2	2	-	-
PC17. check standard tools to simulate, analyse and synthesize design options for electronic circuits	2	2	-	-
PC18. ensure that the designed system matches quality standards and user requirements	2	3	-	-
PC19. review strategies used by the designed system for energy efficiency, environmental standards and safety measures	2	2	-	1
PC20. check noise and electromagnetic interface (EMI) and electromagnetic compatibility (EMC) requirements in electrical and electronic systems	1	2	-	1
PC21. guide initial assessment of the entire system while outlining the possible delivery output with the client and seek their approval	1	3	-	-

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

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National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1407
NOS Name	Create requirement specifications and detailed design documents
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Product Design
NSQF Level	5
Credits	TBD
Version	2.0
Last Reviewed Date	27/01/2022
Next Review Date	03/05/2026
NSQC Clearance Date	03/05/2023

ELE/N1408: Design circuit and PCB layout for the IoT system

Description

This OS unit is specifically designed to prepare learners with the required learning outcomes needed to design an IoT system and achieve desired results.

Scope

The scope covers the following :

- Develop a design for the hardware system
- Build a prototype
- Test the functionality and usability of the prototype

Elements and Performance Criteria

Develop a design for the hardware system

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

PC1. verify prescribed safety guidelines and check microcontroller (or microprocessor) with the desired Read Only Memory (ROM) and frequency to meet the processing requirements of the application

PC2. check that the pin configurations for all components based on input and output requirements have been met

PC3. review the right connectivity modules and other components as per requirement specifications

Build a prototype

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

PC4. test voltage and connect appropriate power source to supply mechanisms and associate capacitors for proper power delivery

PC5. check all connectivity interfaces required between the components of the system, both wired and wireless (short range and long range)

PC6. verify that each component functions as per the design requirements for the system

PC7. guide the team to follow the work schedule and plan using project management principles and tools, and allocate appropriate resources

PC8. supervise the working of the team to ensure that appropriate components meet technical and cost requirements of the system and correct connectivity methods between components has been used

PC9. test the prototype for simulated time and noise numbers (for the entire path) and perform what-if analysis to optimize the system

Test the functionality and usability of the prototype

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

PC10. monitor the desired connectivity between each component, how they actually interact with each other and verify triggering events

PC11. review the memory and storage devices involved in the prototype to ensure that proper programming languages (Embedded C, Assembly code, etc.) have been used and optimum connectivity between the pre-defined pins of the input and output devices is maintained

PC12. verify the prototype and perform a pilot run of the entire system in the simulated client environment

PC13. guide alternate solutions based on optimization techniques and perform minor revisions through what-if scenarios and document the pros and cons

PC14. check the solutions against the regulatory, safety and environmental standards to choose the right manufacturing method for Printed Circuit Board (PCB) or the chips involved

PC15. test one prototype solution (or may be two) and prepare detailed notes of the specifications (dimensions, functional, constraints)

PC16. review the final design specification that fits the requirements of the client and a final Bill of Material (BOM)

PC17. check the schematics entry using standard tools to identify the Printed Circuit board (PCB) Stackup, PCB placement, outing guidelines to PCB Computer Aided Design (CAD) designer and impedance matching requirements

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 work place

KU3. own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities

KU4. reporting structure, inter-department functions, lines and procedures in the work area

KU5. how to engage with specialists for support in order to resolve change requests or fixing deviations in design

KU6. importance of working in clean and safe environment practices and procedures

KU7. the quality processes and guidelines of the organization/customer

KU8. relevant people and their responsibilities within the work area

KU9. documentation and related procedures applicable in the context of employment and work

KU10. escalation matrix and procedures for reporting work and employment related issues

KU11. basic fundamentals of units, measurement and dimensions

KU12. how to carry out error and uncertainty analysis

KU13. how to read and interpret simulated measurement numbers to make inferences

KU14. process of analog to digital conversions and vice-versa

KU15. how to use and apply sensors (light, sound touch, temperature etc.), micro controllers (arm etc.) and microprocessors

KU16. basic architecture structure of a micro controller or a microprocessor (interrupts, cpu, rom, bus control, io ports etc.) and interpreting their pin configuration

KU17. application of digital signal processing principles

KU18. types of wired and wireless standards and a good understanding of their protocols from an osi layer perspective for proper hardware implementation

KU19. appropriate use of communication protocols such as uart, spi, rs32 etc.

KU20. different components used in electronic circuitry and their applications (like leds, resistors, capacitors, etc.).

KU21. how to choose microcontroller interface techniques and how to interface them to other devices

KU22. how to write firmware for input and output devices in c or assembly language

KU23. optimization of bom to minimize product cost and ensure multi-sourcing

Generic Skills (GS)

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

GS1. how to write emails to customers or other staff in form of business communication

GS2. how to fill up appropriate forms, activity logs, attendance sheets as per organizational format in english and/or local language

GS3. how to read/listen and interpret information correctly from various work instruction documents, manuals, health and safety instructions, memos, etc. applicable to the job in english and/or local language

GS4. how to read relevant symbols, labels or descriptions on components and equipment while performing system operation

GS5. methods to convey and share technical information clearly using appropriate language and terminology

GS6. process to check and clarify task-related information

GS7. how to liaise with appropriate authorities using correct protocol

GS8. how to communicate with people in respectful manner following organizational protocol

GS9. how to seek clarification from responsible authority on how to rectify problems at work

GS10. how to identify errors and defects in components as they fail to work in the system and take remedial actions or a work around on the design

GS11. how to plan, prioritize and sequence work operations as per job requirements

GS12. how to organize and analyze information relevant to work

GS13. how to maintain productivity by applying time management, efficient resource utilization and eliminating waste and extra cost in the design

GS14. how to involve the customer at various milestones of the design to keep them abreast on the progress and to seek their approval

GS15. how to update the customer through appropriate forum/communication methodology agreed beforehand

GS16. how to generate a structured problem statement and plan for problem solving as per priority

GS17. methods to identify problems with work planning, procedures, output and behaviour and their implications

GS18. methods to identify sources of information and support for solving a problem

GS19. how to seek assistance and support from relevant authority in case of unresolved problems

GS20. how to apply effective problem resolutions techniques appropriately

GS21. how to monitor effectiveness of problem resolution through appropriate feedback mechanisms

GS22. how to apply logical reasoning to solve problems related to work based on previous experiences

GS23. how to determine the impact of selection of inappropriate work procedures and inputs on overall work outcome

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Develop a design for the hardware system	**9**	**10**	**-**	**6**
PC1. verify prescribed safety guidelines and check microcontroller (or microprocessor) with the desired Read Only Memory (ROM) and frequency to meet the processing requirements of the application	3	3	-	2
PC2. check that the pin configurations for all components based on input and output requirements have been met	3	4	-	2
PC3. review the right connectivity modules and other components as per requirement specifications	3	3	-	2
Build a prototype	**15**	**17**	**-**	**4**
PC4. test voltage and connect appropriate power source to supply mechanisms and associate capacitors for proper power delivery	3	3	-	1
PC5. check all connectivity interfaces required between the components of the system, both wired and wireless (short range and long range)	3	3	-	-
PC6. verify that each component functions as per the design requirements for the system	3	3	-	1
PC7. guide the team to follow the work schedule and plan using project management principles and tools, and allocate appropriate resources	2	3	-	1
PC8. supervise the working of the team to ensure that appropriate components meet technical and cost requirements of the system and correct connectivity methods between components has been used	2	2	-	1
PC9. test the prototype for simulated time and noise numbers (for the entire path) and perform what-if analysis to optimize the system	2	3	-	-
Test the functionality and usability of the prototype	**16**	**23**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. monitor the desired connectivity between each component, how they actually interact with each other and verify triggering events	2	3	-	-
PC11. review the memory and storage devices involved in the prototype to ensure that proper programming languages (Embedded C, Assembly code, etc.) have been used and optimum connectivity between the pre-defined pins of the input and output devices is maintained	2	3	-	-
PC12. verify the prototype and perform a pilot run of the entire system in the simulated client environment	2	3	-	-
PC13. guide alternate solutions based on optimization techniques and perform minor revisions through what-if scenarios and document the pros and cons	2	3	-	-
PC14. check the solutions against the regulatory, safety and environmental standards to choose the right manufacturing method for Printed Circuit Board (PCB) or the chips involved	2	3	-	-
PC15. test one prototype solution (or may be two) and prepare detailed notes of the specifications (dimensions, functional, constraints)	2	3	-	-
PC16. review the final design specification that fits the requirements of the client and a final Bill of Material (BOM)	2	3	-	-
PC17. check the schematics entry using standard tools to identify the Printed Circuit board (PCB) Stackup, PCB placement, outing guidelines to PCB Computer Aided Design (CAD) designer and impedance matching requirements	2	2	-	-
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1408
NOS Name	Design circuit and PCB layout for the IoT system
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Product Design
NSQF Level	5
Credits	TBD
Version	2.0
Last Reviewed Date	27/01/2022
Next Review Date	03/05/2026
NSQC Clearance Date	03/05/2023

ELE/N1409: Build and test the complete IoT system

Description

This OS unit is specifically designed to prepare learners with the required learning outcomes needed to build, test, configure and validate the IoT system.

Scope

The scope covers the following :

- Build the IoT system
- Configure and test the system
- Validate the system correctness against specifications

Elements and Performance Criteria

Build the IoT system

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

PC1. verify that the appropriate manufacturing technology is used to build the system (PCBs and the ICs) for required components as well as their functionality

PC2. ensure all components needed for the system have probing points in the design and their specifications have been documented

PC3. test the PCB in a test apparatus comprising of test and measurement equipment including oscilloscopes, multimeter(s), signal generator(s), protocol tester(s) etc.

Configure and test the system

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

PC4. check that all the required input and output points at every part of the system are properly functioning using the right trigger (for a desired set of inputs, there should a desired set of outputs)

PC5. verify that different type of tests, review, fix system accordingly are used for system testing and check the test results

PC6. troubleshoot the system for any anomalies and correct the defects in the design, if any

PC7. test the system for various intended applications by selecting different possible combinations

Validate the system correctness against specifications

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

PC8. observe and interpret test results against specifications and check for compliance against the specifications

PC9. review Radio Frequency (RF) performance characterization as well as RF performing tuning for boards with RF interfaces, including power amplifier (PA) and low noise amplifier (LNA) tuning, RF network analysis and problem solving

PC10. perform root cause analysis to identify the cause of the problem, if any, or if test results are in disagreement with specifications

PC11. review changes to the specifications or to the tested design and finalize the system

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. relevant legislation, standards, policies, rules and procedures followed in the company relevant to own employment and performance conditions
KU2. relevant health and safety requirements applicable in the work place
KU3. own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities
KU4. reporting structure, inter-department functions, lines and procedures in the work area
KU5. how to engage with specialists for support and correct any deviations to the design specifications
KU6. importance of working in clean and safe environment practices and procedures
KU7. relevant people and their responsibilities within the work place
KU8. escalation matrix and procedures for reporting work and employment related issues
KU9. how to read si units and measurement
KU10. application of terms such as range, linearity, and sensitivity
KU11. how to read analog and digital meters
KU12. meaning of dynamic measurement and response factor
KU13. application of sensors and microcontrollers
KU14. principles of digital signal processing for measurement
KU15. how to prepare block diagram model and feedback control systems
KU16. how to identify sensors and actuating instruments
KU17. principles of digital control and sampled data systems
KU18. different wireless data transmission for iot applications
KU19. project principles methodology and use of project planning tools
KU20. application and method of soldering
KU21. electronics and electrical engineering principles
KU22. different test and measurement equipment such as spectrum analyser, oscilloscope, signal generator, multimeter etc.
KU23. design component selection and block diagram generation
KU24. schematic entry tools from different vendors like cadence, mentor graphics etc.
KU25. signal integrity tools such as mentor graphics hyperlynx
KU26. reliability analysis tools for mtbf calculation
KU27. layout checking, bom generation process, design for testability (dft), design for manufacturability (dfm) techniques
KU28. board bring-up sequence, how to define test cases for production boards
KU29. how to consider both functional and non-functional (ex: scalability) of the overall iot solution while designing test cases
KU30. environmental ruggedization aspects, conformal coating
KU31. PCB and IC manufacturing process, fabrication drawings and assembly process

KU32. design constraints and complete design cycle from understanding customers specifications to production

KU33. quality standards associated with pcb and ic design

KU34. installing and configuring operating systems (linux, windows), storage subsystems

KU35. servers, storage hardware, hardware design, testing, verification and validation

KU36. procedure to recommend/make changes to the design

KU37. research sources for obtaining technical information

KU38. statutory regulations, standards and codes of practice and their implications

KU39. importance of keeping designs developed confidential and consequences of breaching ipr clause

Generic Skills (GS)

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

GS1. how to fill up appropriate forms, activity logs, attendance sheets as per organizational format in english and/or local language

GS2. how to write an email to communicate within and outside the organization as per organization guidelines

GS3. how to read/listen and interpret information correctly from various work instruction documents, manuals, health and safety instructions, memos, etc. applicable to the job in english and/or local language

GS4. how to read relevant symbols, labels or descriptions on components and equipment while designing an iot system

GS5. how to read schematics, blueprints, product and customer specifications

GS6. methods to convey and share technical information clearly

GS7. process to check and clarify task-related information

GS8. how to liaise with appropriate authorities using correct protocol

GS9. how to communicate with people in respectful manner in line with organizational protocol

GS10. how to communicate with external pcb and chip manufacturers

GS11. how to communicate with customer in order to resolve any discrepancies in the design for manufacture aspect

GS12. how to coordinate with various departments such as marketing, sales, production, research and development

GS13. how to work in teams to devise creative solutions

GS14. how to plan and organize own tasks

GS15. how to multi-task, handle additional responsibility and adapt quickly to changing priorities

GS16. how to deal with difficult situations and make decisions

GS17. how to seek clarification from immediate supervisor/responsible authority, if required

GS18. how to identify and document faults/defects in components

GS19. how to plan, prioritize and sequence work operations as per requirement

GS20. how to organize and analyze information relevant to work

GS21. how to maintain productivity by applying time management, efficient resource utilization and eliminating waste and extra cost in the design

GS22. how to focus on customers requirement

GS23. how to respond to customer queries in a timely and appropriate manner

GS24. how to troubleshoot the errors in the system

GS25. how to communicate problems appropriately to others and propose solutions

GS26. how to identify sources of information and support for problem solving

GS27. how to seek assistance and support from other sources to solve problems

GS28. how to apply effective resolution techniques

GS29. how to monitor effectiveness of problem resolution through appropriate feedback mechanisms

GS30. how to apply logical reasoning to solve problems related to work based on experience

GS31. how to determine the impact of selection of inappropriate work procedures and inputs on overall work outcome

GS32. how to spot process and system disruptions and delays

GS33. how to demonstrate leadership in cad system, library management and design release process for high-volume as well as low-volume product manufacturing

GS34. how to ensure the feasibility of the designs based on known principles on physics, engineering and mathematics

GS35. how to suggest corrective actions to reduce repetitive errors

GS36. how to recommend and improve work process with less rework within pcb or chip design function

GS37. how to use test and measurement equipment like oscilloscopes, pcie protocol analysers, spectrum analyser, signal generators, multimeters etc.

GS38. how to use various design tools, equipment, and computer applications and software

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Build the IoT system	**12**	**15**	**-**	**3**
PC1. verify that the appropriate manufacturing technology is used to build the system (PCBs and the ICs) for required components as well as their functionality	4	5	-	1
PC2. ensure all components needed for the system have probing points in the design and their specifications have been documented	4	5	-	1
PC3. test the PCB in a test apparatus comprising of test and measurement equipment including oscilloscopes, multimeter(s), signal generator(s), protocol tester(s) etc.	4	5	-	1
Configure and test the system	**15**	**19**	**-**	**4**
PC4. check that all the required input and output points at every part of the system are properly functioning using the right trigger (for a desired set of inputs, there should a desired set of outputs)	4	5	-	1
PC5. verify that different type of tests, review, fix system accordingly are used for system testing and check the test results	4	5	-	1
PC6. troubleshoot the system for any anomalies and correct the defects in the design, if any	3	5	-	1
PC7. test the system for various intended applications by selecting different possible combinations	4	4	-	1
Validate the system correctness against specifications	**13**	**16**	**-**	**3**
PC8. observe and interpret test results against specifications and check for compliance against the specifications	3	4	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. review Radio Frequency (RF) performance characterization as well as RF performing tuning for boards with RF interfaces, including power amplifier (PA) and low noise amplifier (LNA) tuning, RF network analysis and problem solving	3	4	-	1
PC10. perform root cause analysis to identify the cause of the problem, if any, or if test results are in disagreement with specifications	4	4	-	1
PC11. review changes to the specifications or to the tested design and finalize the system	3	4	-	-
NOS Total	**40**	**50**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1409
NOS Name	Build and test the complete IoT system
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Product Design
NSQF Level	5
Credits	TBD
Version	2.0
Last Reviewed Date	27/01/2022
Next Review Date	03/05/2026
NSQC Clearance Date	03/05/2023

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	-	-

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**	**-**	**-**

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

DGT/VSQ/N0101: Employability Skills (30 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
- 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. understand the significance of employability skills in meeting the job requirements

Constitutional values – Citizenship

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

PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices

Becoming a Professional in the 21st Century

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

PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.

Basic English Skills

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

PC4. speak with others using some basic English phrases or sentences

Communication Skills

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

PC5. follow good manners while communicating with others

PC6. work with others in a team

Diversity & Inclusion

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

PC7. communicate and behave appropriately with all genders and PwD

PC8. report any issues related to sexual harassment

Financial and Legal Literacy

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

PC9. use various financial products and services safely and securely

PC10. calculate income, expenses, savings etc.

PC11. approach the concerned authorities for any exploitation as per legal rights and laws

Essential Digital Skills

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

PC12. operate digital devices and use its features and applications securely and safely

PC13. use internet and social media platforms securely and safely

Entrepreneurship

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

PC14. identify and assess opportunities for potential business

PC15. identify sources for arranging money and associated financial and legal challenges

Customer Service

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

PC16. identify different types of customers

PC17. identify customer needs and address them appropriately

PC18. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

PC19. create a basic biodata

PC20. search for suitable jobs and apply

PC21. identify and register apprenticeship opportunities as per requirement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills

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 basic spoken English language

KU6. Do and dont of effective communication

KU7. inclusivity and its importance

KU8. different types of disabilities and appropriate communication and behaviour towards PwD

KU9. different types of financial products and services

KU10. how to compute income and expenses
KU11. importance of maintaining safety and security in financial transactions
KU12. different legal rights and laws
KU13. how to operate digital devices and applications safely and securely
KU14. ways to identify business opportunities
KU15. types of customers and their needs
KU16. how to apply for a job and prepare for an interview
KU17. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

GS1. communicate effectively using appropriate language
GS2. behave politely and appropriately with all
GS3. perform basic calculations
GS4. solve problems effectively
GS5. be careful and attentive at work
GS6. use time effectively
GS7. maintain hygiene and sanitisation to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**1**	**3**	**-**	**-**
PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC4. speak with others using some basic English phrases or sentences	-	-	-	-
Communication Skills	**1**	**1**	**-**	**-**
PC5. follow good manners while communicating with others	-	-	-	-
PC6. work with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**1**	**-**	**-**
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
Financial and Legal Literacy	**3**	**4**	**-**	**-**
PC9. use various financial products and services safely and securely	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
Essential Digital Skills	**4**	**6**	**-**	**-**
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
Entrepreneurship	**3**	**5**	**-**	**-**
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
Customer Service	**2**	**2**	**-**	**-**
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**1**	**3**	**-**	**-**
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0101
NOS Name	Employability Skills (30 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	2
Credits	1
Version	1.0
Last Reviewed Date	22/10/2024
Next Review Date	22/10/2027
NSQC Clearance Date	22/10/2024

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

Minimum 70% marks are required

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

Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ELE/N1407.Create requirement specifications and detailed design documents	40	50	-	10	100	30
ELE/N1408.Design circuit and PCB layout for the IoT system	40	50	-	10	100	30
ELE/N1409.Build and test the complete IoT system	40	50	-	10	100	20
ELE/N1002.Apply health and safety practices at the workplace	35	65	-	-	100	10
DGT/VSQ/N0101.Employability Skills (30 Hours)	20	30	-	-	50	10
Total	**175**	**245**	**-**	**30**	**450**	**100**

Acronyms

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

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.