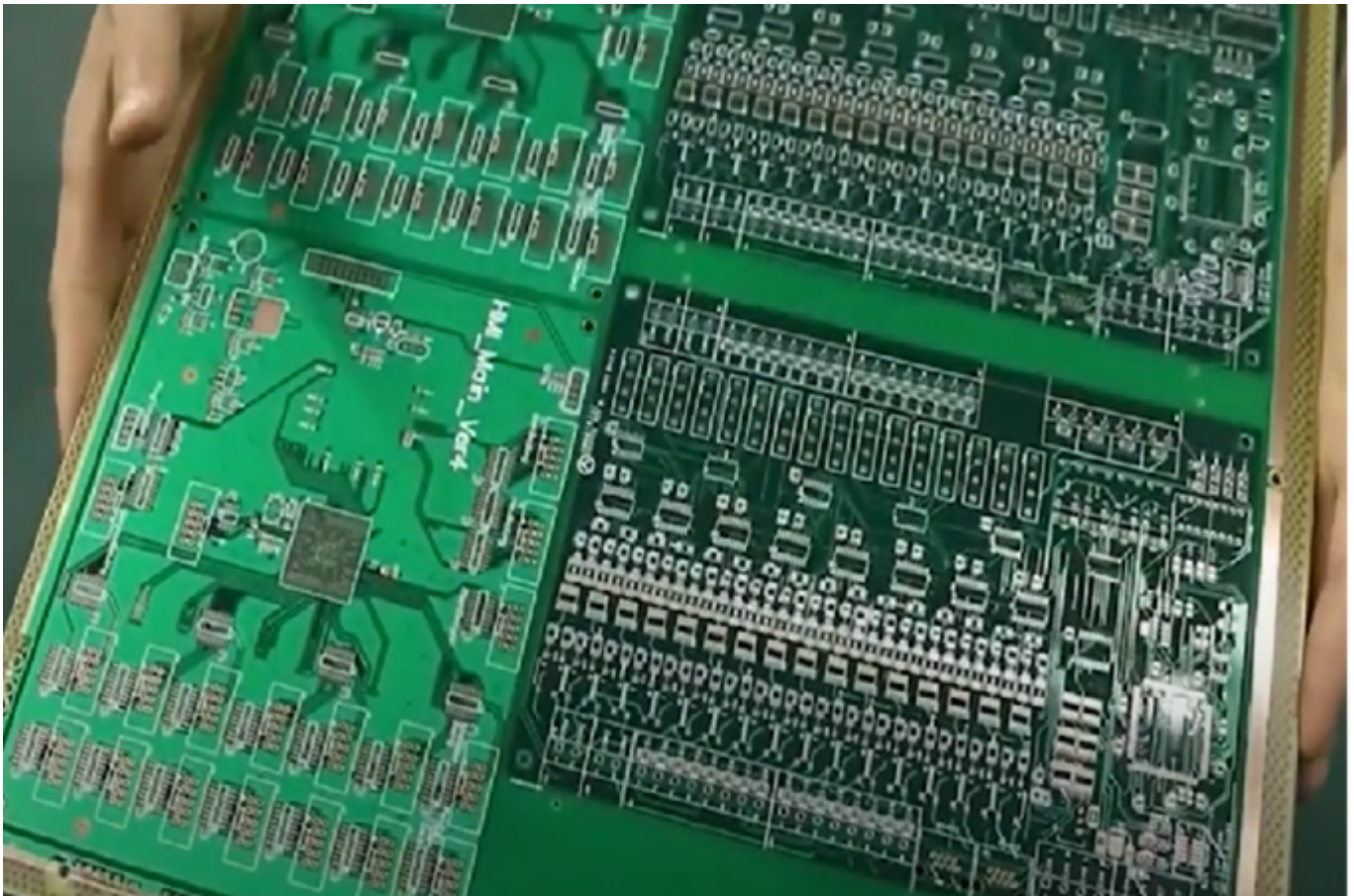


Qualification Pack



Substrate Design and Process Manager

QP Code: TEL/Q7205

Version: 1.0

NSQF Level: 6

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Qualification Pack

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TEL/Q7205: Substrate Design and Process Manager

Brief Job Description

The individual for this job role is responsible to develop the structural blueprint for semiconductor substrates. The individual also requires to design substrate layouts that meet electrical and thermal performance criteria while ensuring manufacturability. In addition, the individual also select materials, conducts simulations, collaborates with fabrication teams, and iterates designs based on testing feedback.

Personal Attributes

The candidate must demonstrate attention to detail, analytical and problem-solving abilities, and effective communication skills, both written and verbal. The individual should be adept at working collaboratively with others.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [TEL/N7216: Substrate Design Support](#)
2. [TEL/N7217: Process Integration and Collaboration](#)
3. [TEL/N7218: Quality Assurance and Documentation](#)
4. [DGT/VSQ/N0103: Employability Skills \(90 Hours\)](#)

Qualification Pack (QP) Parameters

Sector	Telecom
Sub-Sector	Semiconductor-Manufacturing & Packaging
Occupation	Semiconductor-M&P
Country	India
NSQF Level	6
Credits	20
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3522.9900

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Minimum Educational Qualification & Experience	Completed 4 year UG program (Electronics/Telecom/IT) with 1 Year of experience relevant experience OR Completed 2nd year diploma after 12th with 4 Years of experience relevant experience OR Previous relevant Qualification of NSQF Level (5.5) with 1.5 years of experience relevant experience OR Previous relevant Qualification of NSQF Level (5) with 3 Years of experience relevant experience
Minimum Level of Education for Training in School	12th Class
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	22/08/2027
NSQC Approval Date	22/08/2024
Version	1.0
Reference code on NQR	QG-06-TL-02957-2024-V1-TSSC
NQR Version	1.0

Qualification Pack

TEL/N7216: Substrate Design Support

Description

This OS unit equips technicians with the skills to support the design and development of telecom-specific substrates for efficient and high-quality semiconductor assembly.

Scope

The scope covers the following :

- Interpret and Analyze Technical Specifications
- Develop Substrate Layouts
- Utilize CAD Software for Layout Creation/Modification
- Perform Basic Design for Manufacturability (DFM) Analysis

Elements and Performance Criteria

Interpret and Analyze Technical Specifications

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

- PC1.** review and analyze IC datasheets and application notes for features, pin count, and power needs
- PC2.** analyze signal integrity requirements for telecom applications
- PC3.** identify critical substrate dimensions based on IC features and functionality
- PC4.** identify critical tolerances for substrate dimensions
- PC5.** research and select appropriate material properties for the substrate
- PC6.** extract layer stack-up information from design documents
- PC7.** analyze routing guidelines from design documents
- PC8.** identify placement constraints from design documents
- PC9.** analyze power dissipation of the integrated circuit (IC)
- PC10.** evaluate thermal management requirements for the substrate
- PC11.** prepare a summary of key design considerations for internal discussions

Develop Substrate Layouts

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

- PC12.** participate in design meetings with senior engineers to discuss substrate layout concepts
- PC13.** identify potential layout options that meet performance targets like signal integrity and thermal dissipation
- PC14.** analyze manufacturability limitations of available fabrication processes
- PC15.** modify layout concepts to address manufacturability limitations
- PC16.** analyze potential cost implications of different layout choices (e.g., layer count, routing complexity)
- PC17.** research material properties based on cost and performance needs
- PC18.** identify materials compatible with processing requirements

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PC19. collaborate with engineers to select the most suitable material

Utilize CAD Software for Layout Creation/Modification

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

PC20. use CAD software to create basic layouts for telecom substrates

PC21. following established design rules and layer definitions

PC22. place and route components and signals according to design specifications and performance requirements

PC23. perform basic design rule checks (DRC) to ensure the layout adheres to manufacturing guidelines

PC24. route signals according to design specifications and performance requirements

PC25. analyze the feedback from senior engineers on layout design

PC26. identify and address manufacturability concerns in the layout

PC27. modify existing layouts based on feedback or identified manufacturability concerns

PC28. document key decisions and steps taken during the design process

PC29. maintain version control of layout files for future reference

Perform Basic Design for Manufacturability (DFM) Analysis

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

PC30. analyze the layout for potential manufacturability issues such as minimum feature size limitations, via density, and manufacturability of complex routing patterns

PC31. identify areas where the design might exceed equipment capabilities

PC32. identify potential processing challenges based on the layout

PC33. collaborate with design and manufacturing engineers to find solutions that optimize both performance and manufacturability

PC34. document identified DFM issues and proposed solutions for further review

PC35. propose solutions for DFM issues with supporting rationale for review and approval

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. functionality and parameters of telecom integrated circuits (ICs)

KU2. substrate requirements based on IC features (pin count, power needs)

KU3. critical dimensions, tolerances, and material properties for substrates

KU4. design documents like layer stack-up, routing guidelines, and placement constraints

KU5. how to summarize and communicate key design considerations

KU6. design concepts and collaboration in design meetings

KU7. performance targets like signal integrity and thermal dissipation

KU8. manufacturability limitations of fabrication processes

KU9. cost factors associated with different layout choices

KU10. material properties and their impact on performance and cost

KU11. functionalities of CAD software and design rule sets

KU12. component placement and signal routing principles

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- KU13.** importance of Design Rule Checks (DRC)
- KU14.** how to modify layouts based on feedback and manufacturability concerns
- KU15.** design documentation procedures and version control systems
- KU16.** manufacturability limitations (minimum feature size, via density)
- KU17.** equipment capabilities and potential processing challenges
- KU18.** proposing solutions for manufacturability issues
- KU19.** collaborating with engineers for design optimization
- KU20.** documenting DFM issues and proposed solutions

Generic Skills (GS)

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

- GS1.** maintain work-related notes and records
- GS2.** read the relevant literature to get the latest updates about the field of work
- GS3.** listen attentively to understand the information/ instructions being shared
- GS4.** communicate politely and professionally
- GS5.** plan and prioritize tasks to ensure timely completion
- GS6.** coordinate with the co-workers to achieve the work objectives
- GS7.** evaluate all possible solutions to a problem to select the best one
- GS8.** take quick decisions to deal with workplace emergencies/ accidents

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Interpret and Analyze Technical Specifications</i>	12	14	-	3
PC1. review and analyze IC datasheets and application notes for features, pin count, and power needs	1	1	-	1
PC2. analyze signal integrity requirements for telecom applications	1	2	-	-
PC3. identify critical substrate dimensions based on IC features and functionality	1	1	-	-
PC4. identify critical tolerances for substrate dimensions	1	1	-	-
PC5. research and select appropriate material properties for the substrate	1	1	-	1
PC6. extract layer stack-up information from design documents	1	1	-	-
PC7. analyze routing guidelines from design documents	1	2	-	-
PC8. identify placement constraints from design documents	1	1	-	-
PC9. analyze power dissipation of the integrated circuit (IC)	1	1	-	-
PC10. evaluate thermal management requirements for the substrate	1	1	-	-
PC11. prepare a summary of key design considerations for internal discussions	2	2	-	1
<i>Develop Substrate Layouts</i>	10	12	-	2
PC12. participate in design meetings with senior engineers to discuss substrate layout concepts	2	2	-	-
PC13. identify potential layout options that meet performance targets like signal integrity and thermal dissipation	1	1	-	1

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. analyze manufacturability limitations of available fabrication processes	1	1	-	-
PC15. modify layout concepts to address manufacturability limitations	1	2	-	1
PC16. analyze potential cost implications of different layout choices (e.g., layer count, routing complexity)	1	1	-	-
PC17. research material properties based on cost and performance needs	2	1	-	-
PC18. identify materials compatible with processing requirements	1	2	-	-
PC19. collaborate with engineers to select the most suitable material	1	2	-	-
<i>Utilize CAD Software for Layout Creation/Modification</i>	10	12	-	2
PC20. use CAD software to create basic layouts for telecom substrates	1	1	-	-
PC21. following established design rules and layer definitions	1	1	-	-
PC22. place and route components and signals according to design specifications and performance requirements	1	2	-	1
PC23. perform basic design rule checks (DRC) to ensure the layout adheres to manufacturing guidelines	1	1	-	-
PC24. route signals according to design specifications and performance requirements	1	1	-	-
PC25. analyze the feedback from senior engineers on layout design	1	2	-	-
PC26. identify and address manufacturability concerns in the layout	1	1	-	-
PC27. modify existing layouts based on feedback or identified manufacturability concerns	1	1	-	1

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC28. document key decisions and steps taken during the design process	1	1	-	-
PC29. maintain version control of layout files for future reference	1	1	-	-
<i>Perform Basic Design for Manufacturability (DFM) Analysis</i>	8	12	-	3
PC30. analyze the layout for potential manufacturability issues such as minimum feature size limitations, via density, and manufacturability of complex routing patterns	2	2	-	1
PC31. identify areas where the design might exceed equipment capabilities	1	2	-	-
PC32. identify potential processing challenges based on the layout	1	2	-	1
PC33. collaborate with design and manufacturing engineers to find solutions that optimize both performance and manufacturability	2	2	-	-
PC34. document identified DFM issues and proposed solutions for further review	1	2	-	1
PC35. propose solutions for DFM issues with supporting rationale for review and approval	1	2	-	-
NOS Total	40	50	-	10

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N7216
NOS Name	Substrate Design Support
Sector	Telecom
Sub-Sector	
Occupation	Semiconductor-M&P
NSQF Level	6
Credits	6
Version	1.0
Last Reviewed Date	22/08/2024
Next Review Date	22/08/2027
NSQC Clearance Date	22/08/2024

Qualification Pack

TEL/N7217: Process Integration and Collaboration

Description

This OS unit equips individuals to bridge the gap between design and production, ensuring smooth integration of telecom substrate design into the manufacturing workflow and fostering continuous process improvement.

Scope

The scope covers the following :

- Facilitate Technical Communication
- Streamline Integration & Improvement

Elements and Performance Criteria

Facilitate Technical Communication

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

- PC1.** attend design meetings to focused on telecom substrate specifications
- PC2.** ask clarifying questions and contribute to discussions on technical details
- PC3.** collaborate with design engineers to clarify technical requirements for the substrate
- PC4.** discuss and clarify performance targets for signal integrity, thermal dissipation, etc
- PC5.** identify and raise potential manufacturability concerns based on design choices
- PC6.** participate in meetings with production and quality control teams to understand capabilities, limitations
- PC7.** identify potential bottlenecks and quality risks in the current production process for telecom substrates
- PC8.** collaborate with QC to establish clear inspection procedures for completed substrates.
- PC9.** develop and document clear communication channels between design, production, and quality control teams
- PC10.** identify and implement communication channels (e.g., meetings, shared platforms) to facilitate smooth information exchange

Streamline Integration & Improvement

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

- PC11.** analyze potential integration challenges between substrate design and existing production workflow
- PC12.** propose solutions to streamline the integration of substrate design processes
- PC13.** participate in test runs and pilot productions of new substrate designs
- PC14.** monitor the integration process and identify any arising issues or areas for improvement
- PC15.** utilize data analysis techniques to pinpoint areas for efficiency gains or quality enhancement
- PC16.** identify trends and patterns in data that suggest potential improvement areas
- PC17.** collaborate with engineers and technicians to develop and implement process improvement solutions

Qualification Pack

PC18. identify solutions that address identified inefficiencies or quality concerns

PC19. monitor the effectiveness of implemented improvements through data analysis and feedback

PC20. suggest further refinements or adjustments to the improvement solutions

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. telecom substrate functionalities and specifications

KU2. design for manufacturability (DFM) principles

KU3. production capabilities and limitations in substrate assembly

KU4. quality control procedures for telecom substrates

KU5. effective communication and interpersonal skills

KU6. existing production workflow for telecom substrates

KU7. potential integration challenges between design and production

KU8. effective communication channels and documentation practices

KU9. data analysis techniques for identifying process improvement opportunities

KU10. various process improvement methodologies (e.g., Six Sigma, Lean Manufacturing)

KU11. quality control principles and defect prevention strategies

KU12. collaborative problem-solving techniques

KU13. how to monitor and evaluate the effectiveness of implemented improvements

Generic Skills (GS)

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

GS1. maintain work related records

GS2. read the relevant guides and literature to get the latest information about the field of work

GS3. communicate clearly and politely

GS4. listen attentively to understand the information/instructions being shared

GS5. plan and prioritize tasks to ensure timely completion

GS6. identify appropriate solutions to work related issues

GS7. take quick decisions in case of an emergency/accident

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Facilitate Technical Communication</i>	14	30	-	5
PC1. attend design meetings to focused on telecom substrate specifications	1	3	-	1
PC2. ask clarifying questions and contribute to discussions on technical details	1	3	-	-
PC3. collaborate with design engineers to clarify technical requirements for the substrate	2	4	-	1
PC4. discuss and clarify performance targets for signal integrity, thermal dissipation, etc	1	3	-	-
PC5. identify and raise potential manufacturability concerns based on design choices	1	4	-	-
PC6. participate in meetings with production and quality control teams to understand capabilities, limitations	1	2	-	1
PC7. identify potential bottlenecks and quality risks in the current production process for telecom substrates	1	3	-	-
PC8. collaborate with QC to establish clear inspection procedures for completed substrates.	2	2	-	-
PC9. develop and document clear communication channels between design, production, and quality control teams	3	3	-	1
PC10. identify and implement communication channels (e.g., meetings, shared platforms) to facilitate smooth information exchange	1	3	-	1
<i>Streamline Integration & Improvement</i>	16	30	-	5
PC11. analyze potential integration challenges between substrate design and existing production workflow	2	4	-	1
PC12. propose solutions to streamline the integration of substrate design processes	2	4	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. participate in test runs and pilot productions of new substrate designs	2	3	-	1
PC14. monitor the integration process and identify any arising issues or areas for improvement	2	3	-	1
PC15. utilize data analysis techniques to pinpoint areas for efficiency gains or quality enhancement	2	4	-	-
PC16. identify trends and patterns in data that suggest potential improvement areas	1	2	-	1
PC17. collaborate with engineers and technicians to develop and implement process improvement solutions	1	3	-	-
PC18. identify solutions that address identified inefficiencies or quality concerns	2	3	-	1
PC19. monitor the effectiveness of implemented improvements through data analysis and feedback	1	2	-	-
PC20. suggest further refinements or adjustments to the improvement solutions	1	2	-	-
NOS Total	30	60	-	10

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National Occupational Standards (NOS) Parameters

NOS Code	TEL/N7217
NOS Name	Process Integration and Collaboration
Sector	Telecom
Sub-Sector	
Occupation	Semiconductor-M&P
NSQF Level	6
Credits	6
Version	1.0
Last Reviewed Date	22/08/2024
Next Review Date	22/08/2027
NSQC Clearance Date	22/08/2024

Qualification Pack

TEL/N7218: Quality Assurance and Documentation

Description

This OS unit equips technicians with the skills to ensure quality in telecom substrate design through inspections, documentation, and participation in quality control procedures.

Scope

The scope covers the following :

- Perform Quality Control Inspections & Quality Improvement

Elements and Performance Criteria

Perform Quality Control Inspections & Quality Improvement

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

- PC1.** visually inspect completed substrates to identify potential defects (e.g., dimensional errors, surface imperfections)
- PC2.** utilize basic inspection tools and equipment as needed (e.g., microscopes, calipers)
- PC3.** accurately record inspection results and document all substrate design activities
- PC4.** document all substrate design activities, including inspection results
- PC5.** maintain design files and revisions according to established procedures
- PC6.** prepare clear and concise technical documentation for completed substrate designs
- PC7.** participate in the development and implementation of quality control procedures for substrate design
- PC8.** analyze observations and inspection data to identify areas for improvement in existing QC practices
- PC9.** suggest improvements to existing QC practices based on observations and data analysis.
- PC10.** identify any deviations from design specifications or process standards during inspections or review processes
- PC11.** document non-conformances with clear descriptions and potential root causes
- PC12.** escalate identified issues to the appropriate personnel for timely resolution

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** functionality of basic inspection tools and equipment (e.g., microscopes, calipers)
- KU2.** importance of accurate and complete documentation in substrate design
- KU3.** established procedures for maintaining design files and revisions
- KU4.** how to prepare clear and concise technical documentation
- KU5.** quality control principles and procedures for substrate design
- KU6.** data analysis techniques to identify areas for improvement in QC practices

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- KU7.** design specifications and process standards for telecom substrates
- KU8.** non-conformance documentation procedures, including identifying root causes
- KU9.** effective communication protocols for escalating quality issues

Generic Skills (GS)

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

- GS1.** maintain work related records
- GS2.** read the relevant guides and literature to get the latest information about the field of work
- GS3.** communicate clearly and politely
- GS4.** listen attentively to understand the information/instructions being shared
- GS5.** plan and prioritize tasks to ensure timely completion
- GS6.** identify appropriate solutions to work related issues
- GS7.** take quick decisions in case of an emergency/accident

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Perform Quality Control Inspections & Quality Improvement</i>	30	60	-	10
PC1. visually inspect completed substrates to identify potential defects (e.g., dimensional errors, surface imperfections)	2	4	-	1
PC2. utilize basic inspection tools and equipment as needed (e.g., microscopes, calipers)	2	4	-	1
PC3. accurately record inspection results and document all substrate design activities	3	6	-	1
PC4. document all substrate design activities, including inspection results	2	5	-	1
PC5. maintain design files and revisions according to established procedures	2	6	-	1
PC6. prepare clear and concise technical documentation for completed substrate designs	3	5	-	1
PC7. participate in the development and implementation of quality control procedures for substrate design	3	6	-	-
PC8. analyze observations and inspection data to identify areas for improvement in existing QC practices	3	5	-	1
PC9. suggest improvements to existing QC practices based on observations and data analysis.	2	6	-	1
PC10. identify any deviations from design specifications or process standards during inspections or review processes	3	5	-	1
PC11. document non-conformances with clear descriptions and potential root causes	2	4	-	1
PC12. escalate identified issues to the appropriate personnel for timely resolution	3	4	-	-
NOS Total	30	60	-	10

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National Occupational Standards (NOS) Parameters

NOS Code	TEL/N7218
NOS Name	Quality Assurance and Documentation
Sector	Telecom
Sub-Sector	
Occupation	Semiconductor-M&P
NSQF Level	6
Credits	5
Version	1.0
Last Reviewed Date	22/08/2024
Next Review Date	22/08/2027
NSQC Clearance Date	22/08/2024

Qualification Pack

DGT/VSQ/N0103: Employability Skills (90 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

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

- PC1.** understand the significance of employability skills in meeting the current job market requirement and future of work
- PC2.** identify and explore learning and employability relevant portals
- PC3.** research about the different industries, job market trends, latest skills required and the available opportunities

Constitutional values – Citizenship

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

- PC4.** recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.
- PC5.** follow environmentally sustainable practices

Becoming a Professional in the 21st Century

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

- PC6.** recognize the significance of 21st Century Skills for employment

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- PC7.** practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life
- PC8.** adopt a continuous learning mindset for personal and professional development

Basic English Skills

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

- PC9.** use basic English for everyday conversation in different contexts, in person and over the telephone
- PC10.** read and understand routine information, notes, instructions, mails, letters etc. written in English
- PC11.** write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

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

- PC12.** identify career goals based on the skills, interests, knowledge, and personal attributes
- PC13.** prepare a career development plan with short- and long-term goals

Communication Skills

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

- PC14.** follow verbal and non-verbal communication etiquette while communicating in professional and public settings
- PC15.** use active listening techniques for effective communication
- PC16.** communicate in writing using appropriate style and format based on formal or informal requirements
- PC17.** work collaboratively with others in a team

Diversity & Inclusion

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

- PC18.** communicate and behave appropriately with all genders and PwD
- PC19.** escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

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

- PC20.** identify and select reliable institutions for various financial products and services such as bank account, debit and credit cards, loans, insurance etc.
- PC21.** carry out offline and online financial transactions, safely and securely, using various methods and check the entries in the passbook
- PC22.** identify common components of salary and compute income, expenses, taxes, investments etc
- PC23.** identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

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

- PC24.** operate digital devices and use their features and applications securely and safely
- PC25.** carry out basic internet operations by connecting to the internet safely and securely, using the mobile data or other available networks through Bluetooth, Wi-Fi, etc.
- PC26.** display responsible online behaviour while using various social media platforms

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- PC27.** create a personal email account, send and process received messages as per requirement
- PC28.** carry out basic procedures in documents, spreadsheets and presentations using respective and appropriate applications
- PC29.** utilize virtual collaboration tools to work effectively

Entrepreneurship

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

- PC30.** identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research
- PC31.** develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion
- PC32.** identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

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

- PC33.** identify different types of customers and ways to communicate with them
- PC34.** identify and respond to customer requests and needs in a professional manner
- PC35.** use appropriate tools to collect customer feedback
- PC36.** follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

- PC37.** create a professional Curriculum vitae (Résumé)
- PC38.** search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively
- PC39.** apply to identified job openings using offline /online methods as per requirement
- PC40.** answer questions politely, with clarity and confidence, during recruitment and selection
- PC41.** identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** need for employability skills and different learning and employability related portals
- KU2.** various constitutional and personal values
- KU3.** different environmentally sustainable practices and their importance
- KU4.** Twenty first (21st) century skills and their importance
- KU5.** how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up
- KU6.** importance of career development and setting long- and short-term goals
- KU7.** about effective communication
- KU8.** POSH Act
- KU9.** Gender sensitivity and inclusivity
- KU10.** different types of financial institutes, products, and services

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- KU11.** components of salary and how to compute income and expenditure
- KU12.** importance of maintaining safety and security in offline and online financial transactions
- KU13.** different legal rights and laws
- KU14.** different types of digital devices and the procedure to operate them safely and securely
- KU15.** how to create and operate an e- mail account
- KU16.** use applications such as word processors, spreadsheets etc.
- KU17.** how to identify business opportunities
- KU18.** types and needs of customers
- KU19.** how to apply for a job and prepare for an interview
- KU20.** apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

- GS1.** read and write different types of documents/instructions/correspondence in English and other languages
- GS2.** communicate effectively using appropriate language in formal and informal settings
- GS3.** behave politely and appropriately with all to maintain effective work relationship
- GS4.** how to work in a virtual mode, using various technological platforms
- GS5.** perform calculations efficiently
- GS6.** solve problems effectively
- GS7.** pay attention to details
- GS8.** manage time efficiently
- GS9.** maintain hygiene and sanitization to avoid infection

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	1	1	-	-
PC1. understand the significance of employability skills in meeting the current job market requirement and future of work	-	-	-	-
PC2. identify and explore learning and employability relevant portals	-	-	-	-
PC3. research about the different industries, job market trends, latest skills required and the available opportunities	-	-	-	-
<i>Constitutional values – Citizenship</i>	1	1	-	-
PC4. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC5. follow environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	1	3	-	-
PC6. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC7. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
PC8. adopt a continuous learning mindset for personal and professional development	-	-	-	-
<i>Basic English Skills</i>	3	4	-	-
PC9. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC11. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
<i>Career Development & Goal Setting</i>	1	2	-	-
PC12. identify career goals based on the skills, interests, knowledge, and personal attributes	-	-	-	-
PC13. prepare a career development plan with short- and long-term goals	-	-	-	-
<i>Communication Skills</i>	2	2	-	-
PC14. follow verbal and non-verbal communication etiquette while communicating in professional and public settings	-	-	-	-
PC15. use active listening techniques for effective communication	-	-	-	-
PC16. communicate in writing using appropriate style and format based on formal or informal requirements	-	-	-	-
PC17. work collaboratively with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	1	-	-
PC18. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC19. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
<i>Financial and Legal Literacy</i>	2	3	-	-
PC20. identify and select reliable institutions for various financial products and services such as bank account, debit and credit cards, loans, insurance etc.	-	-	-	-
PC21. carry out offline and online financial transactions, safely and securely, using various methods and check the entries in the passbook	-	-	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC22. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC23. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	3	5	-	-
PC24. operate digital devices and use their features and applications securely and safely	-	-	-	-
PC25. carry out basic internet operations by connecting to the internet safely and securely, using the mobile data or other available networks through Bluetooth, Wi-Fi, etc.	-	-	-	-
PC26. display responsible online behaviour while using various social media platforms	-	-	-	-
PC27. create a personal email account, send and process received messages as per requirement	-	-	-	-
PC28. carry out basic procedures in documents, spreadsheets and presentations using respective and appropriate applications	-	-	-	-
PC29. utilize virtual collaboration tools to work effectively	-	-	-	-
<i>Entrepreneurship</i>	2	3	-	-
PC30. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC31. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC32. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
<i>Customer Service</i>	1	2	-	-
PC33. identify different types of customers and ways to communicate with them	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC34. identify and respond to customer requests and needs in a professional manner	-	-	-	-
PC35. use appropriate tools to collect customer feedback	-	-	-	-
PC36. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	2	3	-	-
PC37. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC38. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC39. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC40. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC41. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	20	30	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0103
NOS Name	Employability Skills (90 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	5
Credits	3
Version	1.0
Last Reviewed Date	18/02/2025
Next Review Date	18/02/2028
NSQC Clearance Date	18/02/2025

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).

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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 70% 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
TEL/N7216.Substrate Design Support	40	50	-	10	100	30
TEL/N7217.Process Integration and Collaboration	30	60	-	10	100	30
TEL/N7218.Quality Assurance and Documentation	30	60	-	10	100	30
DGT/VSQ/N0103.Employability Skills (90 Hours)	20	30	-	-	50	10
Total	120	200	-	30	350	100

Qualification Pack

Acronyms

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

Qualification Pack

Glossary

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

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Knowledge and Understanding (KU)	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.