



Automotive Machining Lead Technician

QP Code: ASC/Q3505

Version: 3.0

NSQF Level: 4.5

Automotive Skills Development Council || 153, GF, Okhla Industrial Area, Phase 3
New Delhi 110020 || email:garima@asdc.org.in

Contents

ASC/Q3505: Automotive Machining Lead Technician	3
<i>Brief Job Description</i>	3
Applicable National Occupational Standards (NOS)	3
<i>Compulsory NOS</i>	3
<i>Qualification Pack (QP) Parameters</i>	3
ASC/N9810: Manage work and resources (Manufacturing)	5
ASC/N9805: Interpret engineering drawing	11
ASC/N3540: Manage shop floor Machining operations and team	16
ASC/N3510: Perform machining and post-machining operations	23
DGT/VSQ/N0102: Employability Skills (60 Hours)	30
Assessment Guidelines and Weightage	37
<i>Assessment Guidelines</i>	37
<i>Assessment Weightage</i>	38
Acronyms	39
Glossary	40

ASC/Q3505: Automotive Machining Lead Technician

Brief Job Description

The individual is primarily involved in various machining and inspection work on CNC/conventional machines such as quality verification, minor repair work, resetting of the tools, machine programming etc.

Personal Attributes

The individual must be patient, organized, team-oriented, be able to meet the deadlines for test results and having the ability to work for long hours in adverse conditions. The individual must also be able to communicate effectively.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [ASC/N9810: Manage work and resources \(Manufacturing\)](#)
2. [ASC/N9805: Interpret engineering drawing](#)
3. [ASC/N3540: Manage shop floor Machining operations and team](#)
4. [ASC/N3510: Perform machining and post-machining operations](#)
5. [DGT/VSQ/N0102: Employability Skills \(60 Hours\)](#)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Machining Operation
Country	India
NSQF Level	4.5
Credits	15
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7223.0502

Minimum Educational Qualification & Experience	<p>Completed 3 year diploma after 10th OR 2-year Diploma after 12th grade (in any field) OR B.E./B.Tech (Pursuing 1st year) OR Certificate-NSQF (Automotive CNC Machining Technician Level 3.5) with 3 Years of experience as 8th class pass OR 10th Class with 3 Years of experience (Relevant)</p>
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	20 Years
Last Reviewed On	NA
Next Review Date	NA
NSQC Approval Date	
Version	3.0

ASC/N9810: Manage work and resources (Manufacturing)

Description

This NOS unit is about implementing safety, planning work, adopting sustainable practices for optimising the use of resources.

Scope

The scope covers the following :

- Maintain safe and secure working environment
- Maintain Health and Hygiene
- Effective waste management practices
- Material/energy conservation practices

Elements and Performance Criteria

Maintain safe and secure working environment

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

- PC1.** identify hazardous activities and the possible causes of risks or accidents in the workplace
- PC2.** implement safe working practices for dealing with hazards to ensure safety of self and others
- PC3.** conduct regular checks of the machines with support of the maintenance team to identify potential hazards
- PC4.** ensure that all the tools/equipment/fasteners/spare parts are arranged as per specifications/utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions
- PC5.** organise safety drills or training sessions to create awareness amongst others on the identified risks and safety practices
- PC6.** fill daily check sheet to report improvements done and risks identified
- PC7.** ensure that relevant safety boards/signs are placed on the shop floor for the safety of self and others
- PC8.** report any identified breaches in health, safety and security policies and procedures to the designated person

Maintain Health and Hygiene

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

- PC9.** ensure workplace, equipment, restrooms etc. are sanitized regularly
- PC10.** ensure team is aware about hygiene and sanitation regulations and following them on the shop floor
- PC11.** ensure availability of running water, hand wash and alcohol-based sanitizers at the workplace
- PC12.** report advanced hygiene and sanitation issues to appropriate authority
- PC13.** follow stress and anxiety management techniques and support employees to cope with stress, anxiety etc
- PC14.** wear and dispose PPEs regularly and appropriately

Effective waste management practices

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

PC15. ensure recyclable, non-recyclable and hazardous wastes are segregated as per SOP

PC16. ensure proper mechanism is followed while collecting and disposing of non-recyclable, recyclable and reusable waste

Material/energy conservation practices

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

PC17. ensure malfunctioning (fumes/sparks/emission/vibration/noise) and lapse in maintenance of equipment are resolved effectively

PC18. prepare and analyze material and energy audit reports to decipher excessive consumption of material and water

PC19. identify possibilities of using renewable energy and environment friendly fuels

PC20. identify processes where material and energy/electricity utilization can be optimized

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organisation procedures for health, safety and security, individual role and responsibilities in this context

KU2. the organisation's emergency procedures for different emergency situations and the importance of following the same

KU3. evacuation procedures for workers and visitors

KU4. how and when to report hazards as well as the limits of responsibility for dealing with hazards

KU5. potential hazards, risks and threats based on the nature of work

KU6. various types of fire extinguisher

KU7. various types of safety signs and their meaning

KU8. appropriate first aid treatment relevant to different condition e.g. bleeding, minor burns, eye injuries etc.

KU9. relevant standards, procedures and policies related to 5S followed in the company

KU10. the various materials used and their storage norms

KU11. importance of efficient utilisation of material and water

KU12. basics of electricity and prevalent energy efficient devices

KU13. common practices of conserving electricity

KU14. common sources and ways to minimize pollution

KU15. categorisation of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics

KU16. waste management techniques

KU17. significance of greening

Generic Skills (GS)

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

- GS1.** read safety instructions/guidelines
- GS2.** modify work practices to improve them
- GS3.** work with supervisors/team members to carry out work related tasks
- GS4.** complete tasks efficiently and accurately within stipulated time
- GS5.** inform/report to concerned person in case of any problem
- GS6.** make timely decisions for efficient utilization of resources
- GS7.** write reports such as accident report, in at least English/regional language

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Maintain safe and secure working environment</i>	20	13	-	8
PC1. identify hazardous activities and the possible causes of risks or accidents in the workplace	4	2	-	2
PC2. implement safe working practices for dealing with hazards to ensure safety of self and others	3	1	-	2
PC3. conduct regular checks of the machines with support of the maintenance team to identify potential hazards	2	2	-	1
PC4. ensure that all the tools/equipment/fasteners/spare parts are arranged as per specifications/utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions	3	2	-	1
PC5. organise safety drills or training sessions to create awareness amongst others on the identified risks and safety practices	2	-	-	-
PC6. fill daily check sheet to report improvements done and risks identified	2	2	-	-
PC7. ensure that relevant safety boards/signs are placed on the shop floor for the safety of self and others	2	2	-	1
PC8. report any identified breaches in health, safety and security policies and procedures to the designated person	2	2	-	1
<i>Maintain Health and Hygiene</i>	13	7	-	5
PC9. ensure workplace, equipment, restrooms etc. are sanitized regularly	3	2	-	1
PC10. ensure team is aware about hygiene and sanitation regulations and following them on the shop floor	2	1	-	-
PC11. ensure availability of running water, hand wash and alcohol-based sanitizers at the workplace	2	2	-	1
PC12. report advanced hygiene and sanitation issues to appropriate authority	1	1	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. follow stress and anxiety management techniques and support employees to cope with stress, anxiety etc	2	1	-	1
PC14. wear and dispose PPEs regularly and appropriately	3	-	-	1
<i>Effective waste management practices</i>	6	4	-	1
PC15. ensure recyclable, non-recyclable and hazardous wastes are segregated as per SOP	3	2	-	-
PC16. ensure proper mechanism is followed while collecting and disposing of non-recyclable, recyclable and reusable waste	3	2	-	1
<i>Material/energy conservation practices</i>	11	6	-	6
PC17. ensure malfunctioning (fumes/sparks/emission/vibration/noise) and lapse in maintenance of equipment are resolved effectively	2	2	-	1
PC18. prepare and analyze material and energy audit reports to decipher excessive consumption of material and water	3	2	-	1
PC19. identify possibilities of using renewable energy and environment friendly fuels	3	1	-	2
PC20. identify processes where material and energy/electricity utilization can be optimized	3	1	-	2
NOS Total	50	30	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N9810
NOS Name	Manage work and resources (Manufacturing)
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	30/12/2021
Next Review Date	28/07/2025
NSQC Clearance Date	28/07/2022

ASC/N9805: Interpret engineering drawing

Description

This NOS unit is about reading and interpreting all concepts, symbols, methods, views, etc. of engineering drawing.

Scope

The scope covers the following :

- Interpret information from various views, projection, 2D and 3D shapes
- Identify drawing standards and symbols
- Modification and storage of drawing

Elements and Performance Criteria

Interpret information from various views, projection, 2D and 3D shapes

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

- PC1.** interpret engineering drawing's uniqueness, dimensions and important features in 2D and 3D shapes
- PC2.** identify the difference between 2D and 3D shapes
- PC3.** explain difference between first angle projection and third angle projection in mechanical engineering drawing
- PC4.** interpret all the 3 axes (x, y and z axis) and geometrical shapes (cones, cylinder, sphere, cuboid, etc) on to a 2D and 3D projection
- PC5.** identify details of the machine component which are not clearly visible by interpreting section views

Identify drawing standards and symbols

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

- PC6.** interpret Geometric Dimensioning and Tolerancing (GD&T) symbols in the drawings
- PC7.** interpret symbols of Radius, controlled radius, spherical radius, diameter, spherical diameter, square, counterbore, spotface, depth, countersink, "by", maximum dimension, minimum dimension, reference, dimension origin etc
- PC8.** identify the sequence of operations which enables the selection and prioritization of the datums
- PC9.** read and interpret information from Tolerance Zone boundaries for part features in terms of shape and size

Modification and storage of drawing

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

- PC10.** observe any modification, changes required in the drawing and communicate the same to the concerned team in the organization
- PC11.** store the drawings in an easily accessible place, avoiding damage from moisture, chemicals and fire

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant organisational standards such as work standard, Standard Operating Procedure, quality process, maintenance standards etc. followed in the company
- KU2.** importance of cycle-time and required output as per work order and work instructions
- KU3.** drawing standards used by the company
- KU4.** use of drawing tools such as scales, compass, types of pencils, CAD and CAM software etc.
- KU5.** the basics of engineering drawing, orthographic projection, isometric projection, GD&T etc.
- KU6.** importance of various projections, views, symbols and dimensions of drawing
- KU7.** use of geometric shapes like lines, angles, circles, etc for interpreting the drawing

Generic Skills (GS)

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

- GS1.** read and interpret workplace related drawing
- GS2.** communicate the changes and requirements to supervisor by using relevant drawing terms and nomenclature
- GS3.** attentively listen and comprehend the information given by the supervisor/team members
- GS4.** write in English/regional language
- GS5.** recognise problem in drawing and take suitable action
- GS6.** analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Interpret information from various views, projection, 2D and 3D shapes</i>	21	11	-	10
PC1. interpret engineering drawing's uniqueness, dimensions and important features in 2D and 3D shapes	5	3	-	2
PC2. identify the difference between 2D and 3D shapes	4	2	-	2
PC3. explain difference between first angle projection and third angle projection in mechanical engineering drawing	4	-	-	2
PC4. interpret all the 3 axes (x, y and z axis) and geometrical shapes (cones, cylinder, sphere, cuboid, etc) on to a 2D and 3D projection	5	3	-	2
PC5. identify details of the machine component which are not clearly visible by interpreting section views	3	3	-	2
<i>Identify drawing standards and symbols</i>	23	15	-	8
PC6. interpret Geometric Dimensioning and Tolerancing (GD&T) symbols in the drawings	6	4	-	2
PC7. interpret symbols of Radius, controlled radius, spherical radius, diameter, spherical diameter, square, counterbore, spotface, depth, countersink, "by", maximum dimension, minimum dimension, reference, dimension origin etc	6	4	-	2
PC8. identify the sequence of operations which enables the selection and prioritization of the datums	5	3	-	2
PC9. read and interpret information from Tolerance Zone boundaries for part features in terms of shape and size	6	4	-	2
<i>Modification and storage of drawing</i>	6	4	-	2
PC10. observe any modification, changes required in the drawing and communicate the same to the concerned team in the organization	3	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. store the drawings in an easily accessible place, avoiding damage from moisture, chemicals and fire	3	2	-	1
NOS Total	50	30	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N9805
NOS Name	Interpret engineering drawing
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	25/11/2021
Next Review Date	24/06/2026
NSQC Clearance Date	24/06/2021

ASC/N3540: Manage shop floor Machining operations and team

Description

This NOS is about managing manpower and availability of material on shop floor for a shift/line. It is also about supervising production operations and implementing process and team improvement practices for achieving the targets.

Scope

The scope covers the following :

- Manage manpower and material for the shift/line
- Supervise Production Operations
- Implement process improvement techniques
- Implement team improvement practices

Elements and Performance Criteria

Manage manpower and material for the shift/line

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

- PC1.** allocate requisite manpower based on skill matrix to achieve production targets
- PC2.** support Shift In Charge/Process head/Shop head in finalizing the shift rosters for the week and month based on the production plan
- PC3.** maintain the information on leaves/in-out time and shift/line overtime of the team and share the information with the concerned authorities as per the organisational procedures
- PC4.** send inventory requirements to stores and purchase department and follow up with them to ensure the timely receipt of materials (Spares, Consumables, etc.)
- PC5.** maintain the movement of material and work pieces on the shop floor according to the TAKT time prescribed in the SOP/Work Plans
- PC6.** ensure that the operators and helpers have the required tools and equipment at the start of production process
- PC7.** ensure optimal resource utilization (man, machine and material) and streamlining of activities within the shift

Supervise Production Operations

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

- PC8.** co-ordinate with other departments like stores, paint shop, assembly line, quality, safety, production planning etc. regarding resolution of inter-related problems and achieving required production target and quality standards
- PC9.** implement corrective actions to reduce losses and wastages during shift operation and minimum rejection of components
- PC10.** prepare daily and monthly production MIS reports to analyse the actual performance with the production target and report the same to production incharge
- PC11.** verify the production and material movement related data entries in the system (manual/ERP) for the line/shift and ensure correctness of the data
- PC12.** support the maintenance team in finalizing and executing the preventive maintenance schedule for the shop/line

PC13. support the incharge/Engineer/Shop Head in analysing the various data sheets and reports related to production, maintenance, manpower deployment etc.

Implement process improvement techniques

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

PC14. analyse possible areas of improvements in production line and identify corrective measures to address the gaps

PC15. carry out audit of production process for capability of each operation and prepare reports on the non-compliances for the regulatory authorities by following organizational procedures

PC16. implement various process improvement techniques like Kaizen, 5S, Poka Yoke, TQM etc. on the production line to rectify the failure and gaps in the production process

PC17. analyse machine breakdown trends and current maintenance process to identify areas of improvement and corrective actions for improving the same

PC18. monitor and review the effectiveness of process improvement techniques and corrective actions on production and prepare reports for the regulatory authorities on the same

Implement team improvement practices

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

PC19. encourage team members/operators to suggest quality improvement measures through suggestion schemes, evaluate feasibility of the ideas and discuss their implementation with seniors

PC20. conduct daily floor meeting/morning meetings/staff meetings to communicate the information such as production targets, new guidelines, new processes etc. to team

PC21. organise training sessions for the operators and technicians to improve their skills and knowledge on new techniques and methods

PC22. resolve grievances within the team or escalate them to the concerned authorities if they are beyond the scope

PC23. counsel employees for any work related issues or any personal problems highlighted by the employee

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. relevant manufacturing, quality and maintenance standards and procedures followed in the organisation

KU2. functional processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution

KU3. requirement of raw materials, tools and equipment on the shift/line

KU4. how to prepare shift roster and maintain performance information of the team

KU5. use of ERP system for maintaining and updating production line data

KU6. documents and reports related to production process

KU7. various process improvement techniques like Kaizen, 5S, Poka Yoke, TQM etc

KU8. how to audit gaps and issues in production process and their analysis

KU9. various employee engagement and development practices

KU10. how to handle and solve employee grievances

Generic Skills (GS)

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

- GS1.** read and interpret work instructions, reports and process documents
- GS2.** communicate the production requirements and issues to the seniors and other departments
- GS3.** attentively listen and comprehend the information given by the master technician/team members
- GS4.** write reports related to production process in English/regional language
- GS5.** recognise a workplace problem and take suitable action
- GS6.** analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently
- GS7.** plan and organise work according to the work requirements
- GS8.** report to the supervisor or deal with a colleague individually, depending on the type of concern
- GS9.** complete the assigned tasks with minimum supervision
- GS10.** explore new approach of doing things to resolve issues
- GS11.** suggest improvements (if any) in current ways of working

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Manage manpower and material for the shift/line</i>	9	17	-	6
PC1. allocate requisite manpower based on skill matrix to achieve production targets	2	3	-	1
PC2. support Shift In Charge/Process head/Shop head in finalizing the shift rosters for the week and month based on the production plan	1	3	-	1
PC3. maintain the information on leaves/in-out time and shift/line overtime of the team and share the information with the concerned authorities as per the organisational procedures	2	3	-	1
PC4. send inventory requirements to stores and purchase department and follow up with them to ensure the timely receipt of materials (Spares, Consumables, etc.)	1	2	-	1
PC5. maintain the movement of material and work pieces on the shop floor according to the TAKT time prescribed in the SOP/Work Plans	1	2	-	1
PC6. ensure that the operators and helpers have the required tools and equipment at the start of production process	1	2	-	-
PC7. ensure optimal resource utilization (man, machine and material) and streamlining of activities within the shift	1	2	-	1
<i>Supervise Production Operations</i>	8	11	-	5
PC8. co-ordinate with other departments like stores, paint shop, assembly line, quality, safety, production planning etc. regarding resolution of inter-related problems and achieving required production target and quality standards	1	1	-	1
PC9. implement corrective actions to reduce losses and wastages during shift operation and minimum rejection of components	2	3	-	1
PC10. prepare daily and monthly production MIS reports to analyse the actual performance with the production target and report the same to production incharge	1	3	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. verify the production and material movement related data entries in the system (manual/ERP) for the line/shift and ensure correctness of the data	1	2	-	1
PC12. support the maintenance team in finalizing and executing the preventive maintenance schedule for the shop/line	1	1	-	-
PC13. support the incharge/Engineer/Shop Head in analysing the various data sheets and reports related to production, maintenance, manpower deployment etc.	2	1	-	1
<i>Implement process improvement techniques</i>	8	12	-	7
PC14. analyse possible areas of improvements in production line and identify corrective measures to address the gaps	2	1	-	1
PC15. carry out audit of production process for capability of each operation and prepare reports on the non-compliances for the regulatory authorities by following organizational procedures	1	2	-	1
PC16. implement various process improvement techniques like Kaizen, 5S, Poka Yoke, TQM etc. on the production line to rectify the failure and gaps in the production process	2	5	-	2
PC17. analyse machine breakdown trends and current maintenance process to identify areas of improvement and corrective actions for improving the same	2	2	-	1
PC18. monitor and review the effectiveness of process improvement techniques and corrective actions on production and prepare reports for the regulatory authorities on the same	1	2	-	2
<i>Implement team improvement practices</i>	5	10	-	2
PC19. encourage team members/operators to suggest quality improvement measures through suggestion schemes, evaluate feasibility of the ideas and discuss their implementation with seniors	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC20. conduct daily floor meeting/morning meetings/staff meetings to communicate the information such as production targets, new guidelines, new processes etc. to team	1	2	-	1
PC21. organise training sessions for the operators and technicians to improve their skills and knowledge on new techniques and methods	1	2	-	-
PC22. resolve grievances within the team or escalate them to the concerned authorities if they are beyond the scope	1	2	-	1
PC23. counsel employees for any work related issues or any personal problems highlighted by the employee	1	2	-	-
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3540
NOS Name	Manage shop floor Machining operations and team
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Machining Operation
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	29/07/2021
Next Review Date	29/07/2026
NSQC Clearance Date	29/07/2021

ASC/N3510: Perform machining and post-machining operations

Description

This NOS is about performing end to end machining operations to ensure that the final products manufactured is as per the quality, cost and production norms set by the organization.

Scope

The scope covers the following :

- Prepare for the machining operations
- Perform machining activities
- Manage post-machining activities

Elements and Performance Criteria

Prepare for the machining operations

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

- PC1.** take inputs from the master machining technician regarding production planning
- PC2.** prepare plan and schedule to meet the production target and give instructions to the machining operators and technicians about the processes required to be performed for achieving the same
- PC3.** ensure that all the tools, measuring instruments and input materials required for the job are in stock, functioning properly and available on the shopfloor
- PC4.** ensure that input materials are as per the control plan/check sheet and required quality standards
- PC5.** select the CNC program and make changes/ modifications in the program to increase tool life, product quality and production as per the work instructions and production requirements
- PC6.** ensure that the CNC program is covering all the machine and process parameters, raw materials, cycle time, coolant and lubricant flow etc. as per the equipment operating guidelines
- PC7.** carry out dry run of the program to test and validate its effectiveness and accuracy on machine and if necessary, modify it as per the requirements and SOPs/Work Instructions
- PC8.** check that machine is set for operation and all tools, attachments and fixtures are mounted, installed and aligned properly on the machine
- PC9.** support the machining operators and technicians in setting of the machine parameters like cutting speed, depth of cut and feed rate and positioning of cutting tool and work piece as per the work instructions

Perform machining activities

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

- PC10.** start the machine, produce the first component and inspect it for conformance to required specifications by using precision gauges
- PC11.** check the output for quality, fill run chart and correct the tool setting to meet the required quality output
- PC12.** run the machine for mass production of components, if the first run-piece meets the specified requirements

- PC13.** supervise the machining operations and mass production process of component to ensure delivery as per plan
- PC14.** ensure that machining operators and technicians are following the do's and don'ts of the manufacturing process as defined in SOPs/Work Instructions
- PC15.** take appropriate action in case of any irregularities e.g. power failure, rejection, tool breakage etc.
- PC16.** observe the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction
- PC17.** monitor the process parameters on regular basis and ensure compliance to agreed standards (e.g. ambient air quality, stack monitoring, water quality monitoring etc.)
- PC18.** record the data related to the loss time in case of machine stops and breakdown and report the same to the supervisors and maintenance team
- PC19.** maintain the record of tool offsetting and key dimensions on control charts/SPC record as per organization policies

Manage post-machining activities

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

- PC20.** conduct random sampling and quality checks on the incoming and finished products and report the same to the relevant authorities or take action for its improvement
- PC21.** ensure that the machining operators and technicians are segregating and storing the machined pieces properly and are as per the specified standards
- PC22.** support the machining operators and technicians in minor machine maintenance activities such as oiling or cleaning of machine and its components as per the checklist
- PC23.** check the machine operation for proper working after maintenance activities
- PC24.** prepare and maintain records related to machining and maintenance activities conducted

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** fundamentals of the CNC/conventional machine
- KU2.** various types of machining processes such as drilling, boring, turning etc.
- KU3.** SOP recommended by the manufacturer for using tools, jigs, fixtures, measuring instruments etc., during the machining processes
- KU4.** how to select and modify the CNC machining program
- KU5.** SOP recommended by the organisation for operating CNC and conventional machine
- KU6.** the impact of various machining parameters on the final product
- KU7.** the use of various cutting tools for different machining operations
- KU8.** how to check the first component produced for required specifications
- KU9.** SOP recommended by the organisation for checking defects in the product/work piece
- KU10.** safety requirements for CNC and conventional machine during the machining work
- KU11.** about the various inspection methods for inspecting the quality of machined product

Generic Skills (GS)

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

- GS1.** read and interpret work instructions, machine drawings, reports and process documents
- GS2.** communicate the machining requirements to the seniors and other departments
- GS3.** communicate issues to the supervisor that occur during machining process
- GS4.** attentively listen and comprehend the information given by the master technician/team members
- GS5.** write reports related to production process in English/regional language
- GS6.** recognise a workplace problem and take suitable action
- GS7.** analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently
- GS8.** plan and organise work according to the work requirements
- GS9.** report to the supervisor or deal with a colleague individually, depending on the type of concern
- GS10.** complete the assigned tasks with minimum supervision
- GS11.** suggest improvements (if any) in current ways of working

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for the machining operations</i>	14	22	-	8
PC1. take inputs from the master machining technician regarding production planning	1	2	-	-
PC2. prepare plan and schedule to meet the production target and give instructions to the machining operators and technicians about the processes required to be performed for achieving the same	2	3	-	1
PC3. ensure that all the tools, measuring instruments and input materials required for the job are in stock, functioning properly and available on the shopfloor	2	3	-	1
PC4. ensure that input materials are as per the control plan/check sheet and required quality standards	1	2	-	1
PC5. select the CNC program and make changes/modifications in the program to increase tool life, product quality and production as per the work instructions and production requirements	3	3	-	1
PC6. ensure that the CNC program is covering all the machine and process parameters, raw materials, cycle time, coolant and lubricant flow etc. as per the equipment operating guidelines	2	2	-	1
PC7. carry out dry run of the program to test and validate its effectiveness and accuracy on machine and if necessary, modify it as per the requirements and SOPs/Work Instructions	1	2	-	1
PC8. check that machine is set for operation and all tools, attachments and fixtures are mounted, installed and aligned properly on the machine	1	3	-	1
PC9. support the machining operators and technicians in setting of the machine parameters like cutting speed, depth of cut and feed rate and positioning of cutting tool and work piece as per the work instructions	1	2	-	1
<i>Perform machining activities</i>	11	19	-	8

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. start the machine, produce the first component and inspect it for conformance to required specifications by using precision gauges	1	2	-	1
PC11. check the output for quality, fill run chart and correct the tool setting to meet the required quality output	1	2	-	1
PC12. run the machine for mass production of components, if the first run-piece meets the specified requirements	1	3	-	-
PC13. supervise the machining operations and mass production process of component to ensure delivery as per plan	2	2	-	1
PC14. ensure that machining operators and technicians are following the do's and don'ts of the manufacturing process as defined in SOPs/Work Instructions	1	1	-	1
PC15. take appropriate action in case of any irregularities e.g. power failure, rejection, tool breakage etc.	1	1	-	1
PC16. observe the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction	1	2	-	1
PC17. monitor the process parameters on regular basis and ensure compliance to agreed standards (e.g. ambient air quality, stack monitoring, water quality monitoring etc.)	1	2	-	1
PC18. record the data related to the loss time in case of machine stops and breakdown and report the same to the supervisors and maintenance team	1	2	-	-
PC19. maintain the record of tool offsetting and key dimensions on control charts/SPC record as per organization policies	1	2	-	1
<i>Manage post-machining activities</i>	5	9	-	4
PC20. conduct random sampling and quality checks on the incoming and finished products and report the same to the relevant authorities or take action for its improvement	1	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC21. ensure that the machining operators and technicians are segregating and storing the machined pieces properly and are as per the specified standards	1	1	-	1
PC22. support the machining operators and technicians in minor machine maintenance activities such as oiling or cleaning of machine and its components as per the checklist	1	2	-	1
PC23. check the machine operation for proper working after maintenance activities	1	2	-	-
PC24. prepare and maintain records related to machining and maintenance activities conducted	1	2	-	1
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3510
NOS Name	Perform machining and post-machining operations
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Machining Operation
NSQF Level	5
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	29/07/2026
NSQC Clearance Date	29/07/2021

DGT/VSQ/N0102: Employability Skills (60 Hours)

Description

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

Scope

The scope covers the following :

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

Elements and Performance Criteria

Introduction to Employability Skills

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

- PC1.** identify employability skills required for jobs in various industries
- PC2.** identify and explore learning and employability portals

Constitutional values – Citizenship

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

- PC3.** recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.
- PC4.** follow environmentally sustainable practices

Becoming a Professional in the 21st Century

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

- PC5.** recognize the significance of 21st Century Skills for employment
- PC6.** practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

Basic English Skills

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

- PC7.** use basic English for everyday conversation in different contexts, in person and over the telephone
- PC8.** read and understand routine information, notes, instructions, mails, letters etc. written in English
- PC9.** write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

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

- PC10.** understand the difference between job and career
- PC11.** prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

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

- PC12.** follow verbal and non-verbal communication etiquette and active listening techniques in various settings
- PC13.** work collaboratively with others in a team

Diversity & Inclusion

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

- PC14.** communicate and behave appropriately with all genders and PwD
- PC15.** escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

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

- PC16.** select financial institutions, products and services as per requirement
- PC17.** carry out offline and online financial transactions, safely and securely
- PC18.** identify common components of salary and compute income, expenses, taxes, investments etc
- PC19.** identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

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

- PC20.** operate digital devices and carry out basic internet operations securely and safely
- PC21.** use e- mail and social media platforms and virtual collaboration tools to work effectively
- PC22.** use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

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

- PC23.** identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research
- PC24.** develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion
- PC25.** identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

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

- PC26.** identify different types of customers
- PC27.** identify and respond to customer requests and needs in a professional manner.
- PC28.** follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

- PC29.** create a professional Curriculum vitae (Résumé)
- PC30.** search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively
- PC31.** apply to identified job openings using offline /online methods as per requirement
- PC32.** answer questions politely, with clarity and confidence, during recruitment and selection
- PC33.** identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** need for employability skills and different learning and employability related portals
- KU2.** various constitutional and personal values
- KU3.** different environmentally sustainable practices and their importance
- KU4.** Twenty first (21st) century skills and their importance
- KU5.** how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up
- KU6.** importance of career development and setting long- and short-term goals
- KU7.** about effective communication
- KU8.** POSH Act
- KU9.** Gender sensitivity and inclusivity
- KU10.** different types of financial institutes, products, and services
- KU11.** how to compute income and expenditure
- KU12.** importance of maintaining safety and security in offline and online financial transactions
- KU13.** different legal rights and laws
- KU14.** different types of digital devices and the procedure to operate them safely and securely
- KU15.** how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.
- KU16.** how to identify business opportunities
- KU17.** types and needs of customers
- KU18.** how to apply for a job and prepare for an interview
- KU19.** apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

- GS1.** read and write different types of documents/instructions/correspondence
- GS2.** communicate effectively using appropriate language in formal and informal settings
- GS3.** behave politely and appropriately with all
- GS4.** how to work in a virtual mode

- GS5.** perform calculations efficiently
- GS6.** solve problems effectively
- GS7.** pay attention to details
- GS8.** manage time efficiently
- GS9.** maintain hygiene and sanitization to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	1	1	-	-
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
<i>Constitutional values – Citizenship</i>	1	1	-	-
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	2	4	-	-
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
<i>Basic English Skills</i>	2	3	-	-
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
<i>Career Development & Goal Setting</i>	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
<i>Communication Skills</i>	2	2	-	-
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	2	-	-
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
<i>Financial and Legal Literacy</i>	2	3	-	-
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	3	4	-	-
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
<i>Entrepreneurship</i>	2	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
<i>Customer Service</i>	1	2	-	-
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	2	3	-	-
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	20	30	-	-

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0102
NOS Name	Employability Skills (60 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	31/08/2023
Next Review Date	31/08/2026
NSQC Clearance Date	31/08/2023

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) (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 PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below).
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training centre based on these criteria.
5. In case of successfully passing only certain number of NOSs, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.
6. 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
ASC/N9810.Manage work and resources (Manufacturing)	50	30	-	20	100	10
ASC/N9805.Interpret engineering drawing	50	30	-	20	100	15
ASC/N3540.Manage shop floor Machining operations and team	30	50	-	20	100	30
ASC/N3510.Perform machining and post-machining operations	30	50	-	20	100	35
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	10
Total	180	190	-	80	450	100

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
SOP	Standard Operating Procedure
PwD	Person with Disability
PPE	Personal Protective Equipment
IMS	Integrated Management System
SOW	Statement Of Work
WI	Work Instructions
TQM	Total Quality Management
QC	Quality control
ERP	Enterprise Resource Planning
GD&T	Geometric Dimensioning & Tolerancing
CAD	Computer-Aided Drafting
CAM	Computer-Aided Manufacturing
ERP	Enterprise Resource Planning
CNC	Computerized Numerical Control
QC	Quality control
GD&T	Geometric Dimensioning & Tolerancing
CNC	Computerized Numerical Control

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.