



Automotive Machining Master Technician

QP Code: ASC/Q3506

Version: 2.0

NSQF Level: 6

Automotive Skills Development Council || 153, Gr Floor, Okhla Industrial Area, Phase - III, Leela Building
New Delhi - 110020

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ASC/Q3506: Automotive Machining Master Technician

Brief Job Description

The individual is primarily involved in various machining and new product development processes on CNC/conventional machines such as writing and modifying CNC program, quality verification, resetting of the tools, machine PPAP process, six sigma capability study 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/N9812: Interact effectively with team, customers and others](#)
3. [ASC/N9805: Interpret engineering drawing](#)
4. [ASC/N3540: Manage shop floor Machining operations and team](#)
5. [ASC/N3511: Plan, execute and evaluate the machine processes for new product development](#)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Machining Operation
Country	India
NSQF Level	6
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7223.0501

Minimum Educational Qualification & Experience	10th Class + I.T.I (Machinist/Turner) with 5 Years of experience OR Diploma Mechanical/ Automobile) from a recognized body with relevant 3 Years of experience OR Certificate-NSQF (Automotive Machining Lead Technician Level 5) with 3 Years of Experience
Minimum Level of Education for Training in School	Not Applicable
Pre-Requisite License or Training	NA
Minimum Job Entry Age	21 Years
Last Reviewed On	29/07/2021
Next Review Date	29/07/2026
NSQC Approval Date	29/07/2021
Version	2.0

ASC/N9803: 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/N9803
NOS Name	Manage work and resources (Manufacturing)
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	29/07/2021
Next Review Date	29/07/2026
NSQC Clearance Date	29/07/2021

ASC/N9802: Interact effectively with team, customers and others

Description

This unit is about communicating with team members, superior and others.

Scope

The scope covers the following :

- Communicate effectively with team members
- Interact with superiors
- Respect gender and ability differences

Elements and Performance Criteria

Communicate effectively with team members

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

- PC1. implement ways to share information with team members in line with organisational requirements
- PC2. ensure that work requirements are clearly communicated to the team members through all means including face-to-face, telephonic and written
- PC3. manage and co-ordinate with team members to integrate work as per requirements
- PC4. work in a way that show respect for all team members and customers
- PC5. carry out commitments made to team members and let them know in good time if there is any discrepancy with reasons
- PC6. resolve conflicts within the team members at work to achieve smooth workflow
- PC7. guide the team members to follow the organisation's policies and procedures
- PC8. ensure team goals are given preference over individual goals
- PC9. respect personal space of colleagues and customers

Interact with superiors

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

- PC10. report progress on job allocated and team performance to the superiors
- PC11. escalate problems to superiors that cannot be handled
- PC12. train the team members to report completed work and receive feedback on work done
- PC13. encourage team members to rectify errors as per feedback and minimize mistakes in future

Respect gender and ability differences

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

- PC14. ensure team shows sensitivity towards all genders and PwD
- PC15. adjust communication styles to reflect gender sensitivity and sensitivity towards person with disability
- PC16. help PwD team members to overcome the challenges, if asked

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. the importance of effective communication and establishing good working relationships with team members and superiors
- KU2. different methods of communication as per the circumstances
- KU3. gender based concepts, issues and legislation
- KU4. organisation standards and guidelines to be followed for PwD
- KU5. rights and duties at workplace with respect to PwD
- KU6. organisation policies and procedures pertaining to written and verbal communication

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. make timely decisions for efficient utilization of resources
- GS6. read instructions/guidelines/procedures
- GS7. write in English/any one language

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Communicate effectively with team members</i>	20	14	-	8
PC1. implement ways to share information with team members in line with organisational requirements	2	2	-	-
PC2. ensure that work requirements are clearly communicated to the team members through all means including face-to-face, telephonic and written	2	2	-	2
PC3. manage and co-ordinate with team members to integrate work as per requirements	2	1	-	2
PC4. work in a way that show respect for all team members and customers	3	1	-	2
PC5. carry out commitments made to team members and let them know in good time if there is any discrepancy with reasons	2	2	-	-
PC6. resolve conflicts within the team members at work to achieve smooth workflow	3	2	-	-
PC7. guide the team members to follow the organisation's policies and procedures	2	1	-	-
PC8. ensure team goals are given preference over individual goals	2	1	-	-
PC9. respect personal space of colleagues and customers	2	2	-	2
<i>Interact with superiors</i>	18	10	-	7
PC10. report progress on job allocated and team performance to the superiors	4	3	-	2
PC11. escalate problems to superiors that cannot be handled	4	2	-	1
PC12. train the team members to report completed work and receive feedback on work done	5	2	-	2
PC13. encourage team members to rectify errors as per feedback and minimize mistakes in future	5	3	-	2

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Respect gender and ability differences</i>	12	6	-	5
PC14. ensure team shows sensitivity towards all genders and PwD	4	2	-	2
PC15. adjust communication styles to reflect gender sensitivity and sensitivity towards person with disability	4	2	-	2
PC16. help PwD team members to overcome the challenges, if asked	4	2	-	1
NOS Total	50	30	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N9802
NOS Name	Interact effectively with team, customers and others
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	29/07/2021
Next Review Date	29/07/2026
NSQC Clearance Date	29/07/2021

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	6
Credits	TBD
Version	1.0
Last Reviewed Date	29/07/2021
Next Review Date	29/07/2026
NSQC Clearance Date	29/07/2021

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	6
Credits	TBD
Version	1.0
Last Reviewed Date	29/07/2021
Next Review Date	29/07/2026
NSQC Clearance Date	29/07/2021

ASC/N3511: Plan, execute and evaluate the machine processes for new product development

Description

This NOS is about performing end to end machining operations, writing and modifying CNC machine program, PPAP process and six sigma capability study for the new product development as per the quality, cost and production norms set by the organization.

Scope

The scope covers the following :

- Plan machining operations for Production Part Approval Process (PPAP)
- Execute machining operations for PPAP
- Evaluate machine operations and CNC program for PPAP
- Co-ordinate with other departments

Elements and Performance Criteria

Plan machining operations for Production Part Approval Process (PPAP)

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

- PC1. give instructions to the machining lead technician about the production target and planning
- PC2. support machining lead technician in preparing the production plan and schedule to meet the production target
- PC3. interpret the information from drawing for new part to be developed
- PC4. set and modify the programming of all types of CNC machines as per the production requirements
- PC5. calculate and set 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
- PC6. review the CNC program for covering all the machine and process parameters

Execute machining operations for PPAP

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

- PC7. use pre-setters to set the tools before loading them on the Auto Tool Changer (ATC)
- PC8. 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
- PC9. check that machine is set for operation and all tools, attachments and fixtures are mounted, installed and aligned properly on the machine
- PC10. set the zero-off set position in position to align it with the fixture
- PC11. start the machine, produce the first component and inspect it for conformance to required specifications by using precision gauges
- PC12. check the output for quality, fill run chart and correct the tool set to meet the required quality output

Evaluate machine operations and CNC program for PPAP

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

- PC13. test and validate the effectiveness and accuracy of program on machine
- PC14. write complete process sheet for new component for all kind of machine processes that optimizes cycle time, tool life and cost of production
- PC15. modify the process sheet as per the process requirement
- PC16. create all PPAP documents as per the organisational guidelines
- PC17. conduct six sigma process capability study and establish desired process capability levels after producing first component as per required standards
- PC18. select machines which are not process capable and make them process capable as desired by the organisation
- PC19. audit process capability regularly to ensure that all machines are process capable as desired by the organisation

Co-ordinate with other departments

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

- PC20. co-ordinate regularly with R&D department regarding Design For Manufacturing (DFM) to ensure that all components are manufacturable before R&D releases the drawing
- PC21. co-ordinate with other departments such as tool store, maintenance, vendors, engineering, production etc. for smooth establishment of new part production and its processes

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. relevant manufacturing and quality standards and procedures followed in the company
- KU2. functional processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution
- KU3. fundamentals of the CNC/conventional machine
- KU4. various types of machining processes such as drilling, boring, turning etc.
- KU5. different types of tools and toolings used in the machining process with respect to type of process to be conducted
- KU6. SOP recommended by the manufacturer for using tools, jigs, fixtures, measuring instruments etc., during the machining processes
- KU7. how to write and modify the CNC machining program
- KU8. SOP recommended by the organisation for operating CNC
- KU9. the impact of various machining parameters on the final product
- KU10. the use of various cutting tools for different machining operations
- KU11. how to check the first component produced for required specifications
- KU12. about the manufacturability of items under different processes (required for DFM)
- KU13. use of Production Part Approval Process (PPAP) in new product developemnt process
- KU14. use of six sigma in anufacturing in new product developemnt process

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 production incharge that occur during machining process
- GS4. attentively listen and comprehend the information given by the production incharge/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. complete the assigned tasks with in targeted time
- GS10. suggest improvements (if any) in current ways of working

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Plan machining operations for Production Part Approval Process (PPAP)</i>	12	13	-	5
PC1. give instructions to the machining lead technician about the production target and planning	1	1	-	-
PC2. support machining lead technician in preparing the production plan and schedule to meet the production target	1	2	-	1
PC3. interpret the information from drawing for new part to be developed	2	1	-	1
PC4. set and modify the programming of all types of CNC machines as per the production requirements	2	3	-	1
PC5. calculate and set 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	4	3	-	-
PC6. review the CNC program for covering all the machine and process parameters	2	3	-	2
<i>Execute machining operations for PPAP</i>	12	9	-	7
PC7. use pre-setters to set the tools before loading them on the Auto Tool Changer (ATC)	2	3	-	1
PC8. 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	2	2	-	1
PC9. check that machine is set for operation and all tools, attachments and fixtures are mounted, installed and aligned properly on the machine	2	-	-	2
PC10. set the zero-off set position in position to align it with the fixture	2	-	-	1
PC11. start the machine, produce the first component and inspect it for conformance to required specifications by using precision gauges	2	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. check the output for quality, fill run chart and correct the tool set to meet the required quality output	2	2	-	1
<i>Evaluate machine operations and CNC program for PPAP</i>	14	14	-	7
PC13. test and validate the effectiveness and accuracy of program on machine	2	2	-	-
PC14. write complete process sheet for new component for all kind of machine processes that optimizes cycle time, tool life and cost of production	2	2	-	1
PC15. modify the process sheet as per the process requirement	1	2	-	1
PC16. create all PPAP documents as per the organisational guidelines	2	2	-	1
PC17. conduct six sigma process capability study and establish desired process capability levels after producing first component as per required standards	4	2	-	2
PC18. select machines which are not process capable and make them process capable as desired by the organization	2	2	-	1
PC19. audit process capability regularly to ensure that all machines are process capable as desired by the organization	1	2	-	1
<i>Co-ordinate with other departments</i>	2	4	-	1
PC20. co-ordinate regularly with R&D department regarding Design For Manufacturing (DFM) to ensure that all components are manufacturable before R&D releases the drawing	1	2	-	1
PC21. co-ordinate with other departments such as tool store, maintenance, vendors, engineering, production etc. for smooth establishment of new part production and its processes	1	2	-	-
NOS Total	40	40	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3511
NOS Name	Plan, execute and evaluate the machine processes for new product development
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Machining Operation
NSQF Level	6
Credits	TBD
Version	2.0
Last Reviewed Date	29/07/2021
Next Review Date	29/07/2026
NSQC Clearance Date	29/07/2021

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down the proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on the 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 the theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.
6. 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/N9812.Interact effectively with team, customers and others	50	30	-	20	100	10
ASC/N9805.Interpret engineering drawing	50	30	-	20	100	5
ASC/N3540.Manage shop floor Machining operations and team	30	50	-	20	100	30
ASC/N3511.Plan, execute and evaluate the machine processes for new product development	40	40	-	20	100	45
Total	220	180	-	100	500	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
SOP	Standard Operating Procedure
PwD	Person with Disability
PPE	Personal Protective Equipment
SOP	Standard Operating Procedure
GD&T	Geometric Dimensioning & Tolerancing
CAD	Computer-Aided Drafting
CAM	Computer-Aided Manufacturing
R&D	Research & Development
DFM	Design For Manufacturing
CNC	Computerized Numerical Control
PPAP	Production Part Approval Process
FPI	First Part Inspection
ATC	Auto Tool Changer
TPM	Total Productive Maintenance
TQM	Total Quality Management
ISO	International Standards Organization
IATF	International Automotive Task Force
PLC	Programmable Logic Controller
SOP	Standard Operating Procedure
CNC	Computerized Numerical Control

TPM	Total Productive Maintenance
TQM	Total Quality Management
ISO	International Standard Organization
IATF	International Automotive Task Force
SOP	Standard Operating Procedure
GD&T	Geometric Dimensioning & Tolerancing
CAD	Computer-Aided Drafting
CAM	Computer-Aided Manufacturing
R&D	Research & Development
DFM	Design For Manufacturing
CNC	Computerized Numerical Control
PPAP	Production Part Approval Process
FPI	First Part Inspection
ATC	Auto Tool Changer
TPM	Total Productive Maintenance
TQM	Total Quality Management
ISO	International Standards Organization
IATF	International Automotive Task Force
PLC	Programmable Logic Controller
SOP	Standard Operating Procedure
CNC	Computerized Numerical Control
TPM	Total Productive Maintenance
TQM	Total Quality Management
ISO	International Standard Organization
IATF	International Automotive Task Force

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.