Qualification Pack

CNC Programmer

QP Code: CSC/Q0401

Version: 4.0

NSQF Level: 5

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CSC/Q0401: CNC Programmer

Brief Job Description

A CNC Programmer is responsible for programming commercial Computer Numerical Control (CNC) factory machines that turn raw materials such as plastic and metals into usable components. The individual is responsible for interpreting technical blueprints, inputting the design specifications, adjusting the machine cutting paths, and performing quality checks on the final product to ensure the desired specifications are achieved. The person is also responsible for carrying out routine machine maintenance and troubleshooting any issues encountered during the manufacturing process.

Personal Attributes

The individual must have attention to detail along with analytical and problem-solving skills. The person must be able to perform his duties independently and also work in coordination with others to achieve the work objectives. The individual must be physically fit to work for long durations with concentration. Basic communication, numerical and computational abilities are the other important requirements in this job role.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. CSC/N1335: Follow the health and safety practices at the work

2. CSC/N1336: Coordinate with co-workers to achieve work efficiency

3. CSC/N0401: Program advanced digital manufacturing Computer Numerically Controlled (CNC) machines.

4. CSC/N0415: Assist in process improvements and machine maintenance

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

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools
Occupation	Design
Country	India

NSQF Level	5
Credits	18
Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification & Experience	Completed 2nd year diploma after 12th (Electrical/Mechanical) OR Completed 3 year diploma after 10th with 1.5 years of experience relevant OR Completed 1st year of UG (UG Certificate) (or equivalent) OR Previous relevant Qualification of NSQF Level (4.5) with 1.5 years of experience relevant OR Previous relevant Qualification of NSQF Level (4) with 3 Years of experience relevant
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	08/05/2028
NSQC Approval Date	08/05/2025
Version	4.0
Reference code on NQR	QG-05-CG-03928-2025-V2-CGSSC
NQR Version	4.0

Qualification Pack

CSC/N1335: Follow the health and safety practices at the work

Description

This OS unit is about following the appropriate health and safety practices at work. It covers responsibilities towards self and others to ensure a safe work environment.

Scope

The scope covers the following :

- Maintain personal health and safety
- Assist in hazard management
- Check the first aid box, firefighting and safety equipment
- Assist in waste management
- Follow the fire safety guidelines
- Follow the emergency and first-aid procedures
- Carry out relevant documentation and review

Elements and Performance Criteria

Maintain personal health and safety

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

PC1. follow the recommended practices to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask

PC2. check the work conditions, assess the potential health and safety risks, and take appropriate measures to mitigate them

PC3. select and use the appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions

PC4. follow the recommended techniques while lifting and moving heavy objects to avoid injury

PC5. follow the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment

Assist in hazard management

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

PC6. identify existing and potential hazards at work

PC7. assess the potential risks and injuries associated with the identified hazards

PC8. coordinate with the supervisor or other relevant personnel to prevent or minimise the identified hazards

PC9. handle hazardous materials safely and store them in the designated storage

Check the first aid box, firefighting and safety equipment

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

PC10. check the first aid box to ensure it is updated with the relevant first aid supplies

PC11. check and test the firefighting and various safety equipment to ensure they are in usable condition

PC12. coordinate with the supervisor for the repair and replacement of firefighting and safety equipment

Assist in waste management

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

PC13. segregate waste into appropriate categories

PC14. recycle the recyclable waste appropriately

PC15. dispose of the non-recyclable waste in an environment-friendly manner, complying with the applicable regulations

Follow the fire safety guidelines

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

PC16. use the appropriate type of fire extinguisher to extinguish different types of fires safely

PC17. follow the recommended practices for a safe rescue during a fire emergency

PC18. coordinate with the fire department to request assistance to extinguish a serious fire

Follow the emergency and first-aid procedures

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

PC19. follow the organisational health and safety guidelines during workplace emergencies to ensure own and co-workers' safety

PC20. follow the recommended practices to minimise loss to organisational property during an emergency

PC21. follow the recommended procedure to free a person from electrocution

PC22. administer appropriate first aid to the injured personnel

PC23. perform Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest

PC24. coordinate with the emergency services to request medical assistance for seriously injured/ill personnel requiring professional medical attention or hospitalisation

Carry out relevant documentation and review

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

PC25. carry out appropriate documentation following a health and safety incident at work, including all the required information

PC26. coordinate with the relevant personnel to review health and safety conditions at work regularly or following an incident

PC27. assist in implementing appropriate changes to improve the health and safety conditions at work

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the recommended practices to be followed to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask

KU2. the importance and process of checking the work conditions, assessing the potential health and safety risks, and take appropriate measures to mitigate them

KU3. the importance and process of selecting and using the appropriate PPE relevant to the task and work conditions

KU4. the recommended techniques to be followed while lifting and moving heavy objects to avoid injury

KU5. the importance of following the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment

KU6. the importance and process of identifying existing and potential hazards at work

KU7. the process of assessing the potential risks and injuries associated with the various hazards

KU8. how to prevent or minimise different types of hazards

KU9. how to handle and store hazardous materials safely

KU10. the importance of ensuring the first aid box is updated with the relevant first aid supplies

KU11. the process of checking and testing the firefighting and various safety equipment to ensure they are in a usable condition

KU12. the criteria for segregating waste into appropriate categories

KU13. the appropriate methods for recycling the recyclable waste

KU14. the process of disposing of the non-recyclable waste safely and the applicable regulations

KU15. Use of different types of fire extinguishers to extinguish different types of fires

KU16. the recommended practices to be followed for a safe rescue during a fire emergency

KU17. how to request assistance from the fire department to extinguish a serious fire

KU18. the appropriate practices to be followed during workplace emergencies to ensure safety and minimise loss to organisational property

KU19. common health and safety hazards present in a work environment, associated risks, and how to mitigate them

KU20. safe working practices to be followed while working at various hazardous sites and using electrical equipment

KU21. the importance of ensuring easy access to firefighting and safety equipment

KU22. the appropriate preventative and remedial actions to be taken in the case of exposure to toxic materials, such as poisonous chemicals and gases

KU23. various causes of fire in different work environments and the recommended precautions to be taken to prevent fire accidents

KU24. different methods of extinguishing fire

KU25. different materials used for extinguishing fire, such as sand, water, foam, CO_2, dry powder, etc.

KU26. the applicable rescue techniques to be followed during a fire emergency

KU27. the importance of placing safety signs and instructions at strategic locations in a workplace and following them

KU28. different types of first aid treatment to be provided for different types of injuries

KU29. potential injuries associated with incorrect manual handling

KU30. how to move an injured person safely

KU31. various hazards associated with the use of various machinery, tools, implements, equipment and materials

KU32. the importance of ensuring no obstruction and free access to fire exits

KU33. how to free a person from electrocution safely

KU34. how to administer appropriate first aid to an injured person

KU35. how to perform Cardiopulmonary Resuscitation (CPR)

KU36. the importance of coordinating with the emergency services to request urgent medical assistance for persons requiring professional medical attention or hospitalisation

KU37. the appropriate documentation to be carried out following a health and safety incident at work, and the relevant information to be included

KU38. the importance and process of reviewing the health and safety conditions at work regularly or following an incident

KU39. the importance and process of implementing appropriate changes to improve the health and safety conditions at work

Generic Skills (GS)

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

GS1. maintain work-related notes and records

GS2. communicate clearly and politely with co-workers and clients

GS3. read the relevant literature to get the latest updates about the field of work

GS4. listen attentively to understand the information being shared

GS5. plan and prioritise tasks to ensure timely completion

GS6. take quick decisions to deal with workplace emergencies and accidents

GS7. identify possible disruptions to work and take appropriate preventive measures

GS8. coordinate with the co-workers to achieve the work objectives

GS9. evaluate all possible solutions to a problem to select the best one

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Maintain personal health and safety	**7**	**12**	**-**	**-**
PC1. follow the recommended practices to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask	2	3	-	-
PC2. check the work conditions, assess the potential health and safety risks, and take appropriate measures to mitigate them	1	2	-	-
PC3. select and use the appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions	1	2	-	-
PC4. follow the recommended techniques while lifting and moving heavy objects to avoid injury	1	3	-	-
PC5. follow the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment	2	2	-	-
Assist in hazard management	**4**	**10**	**-**	**-**
PC6. identify existing and potential hazards at work	1	1	-	-
PC7. assess the potential risks and injuries associated with the identified hazards	1	3	-	-
PC8. coordinate with the supervisor or other relevant personnel to prevent or minimise the identified hazards	1	3	-	-
PC9. handle hazardous materials safely and store them in the designated storage	1	3	-	-
Check the first aid box, firefighting and safety equipment	**3**	**7**	**-**	**-**
PC10. check the first aid box to ensure it is updated with the relevant first aid supplies	1	2	-	-
PC11. check and test the firefighting and various safety equipment to ensure they are in usable condition	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. coordinate with the supervisor for the repair and replacement of firefighting and safety equipment	1	2	-	-
Assist in waste management	**3**	**8**	**-**	**-**
PC13. segregate waste into appropriate categories	1	3	-	-
PC14. recycle the recyclable waste appropriately	1	3	-	-
PC15. dispose of the non-recyclable waste in an environment-friendly manner, complying with the applicable regulations	1	2	-	-
Follow the fire safety guidelines	**3**	**12**	**-**	**-**
PC16. use the appropriate type of fire extinguisher to extinguish different types of fires safely	1	4	-	-
PC17. follow the recommended practices for a safe rescue during a fire emergency	1	4	-	-
PC18. coordinate with the fire department to request assistance to extinguish a serious fire	1	4	-	-
Follow the emergency and first-aid procedures	**7**	**12**	**-**	**-**
PC19. follow the organisational health and safety guidelines during workplace emergencies to ensure own and co-workers' safety	1	2	-	-
PC20. follow the recommended practices to minimise loss to organisational property during an emergency	1	3	-	-
PC21. follow the recommended procedure to free a person from electrocution	1	2	-	-
PC22. administer appropriate first aid to the injured personnel	1	2	-	-
PC23. perform Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest	1	2	-	-
PC24. coordinate with the emergency services to request medical assistance for seriously injured/ ill personnel requiring professional medical attention or hospitalisation	2	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Carry out relevant documentation and review	**3**	**9**	**-**	**-**
PC25. carry out appropriate documentation following a health and safety incident at work, including all the required information	1	3	-	-
PC26. coordinate with the relevant personnel to review health and safety conditions at work regularly or following an incident	1	3	-	-
PC27. assist in implementing appropriate changes to improve the health and safety conditions at work	1	3	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N1335
NOS Name	Follow the health and safety practices at the work
Sector	Capital Goods
Sub-Sector	Machine Tools, Process Plant Machinery, Dies, Moulds and Press Tools, Electrical and Power Machinery, Plastics Manufacturing Machinery, Light Engineering Goods, Textile Manufacturing Machinery
Occupation	Machining
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

CSC/N1336: Coordinate with co-workers to achieve work efficiency

Description

This OS unit is about working in coordination with co-workers to achieve the work objectives efficiently. It also covers practising inclusion at work.

Scope

The scope covers the following :

- Work effectively with co-workers
- Communicate effectively with co-workers
- Practice inclusion at work

Elements and Performance Criteria

Work effectively with co-workers

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

PC1. plan daily tasks at work to ensure their timely completion and efficient use of time

PC2. carry out work responsibilities adhering to the limits of authority

PC3. follow the supervisor's instructions to ensure adherence to the applicable quality standards and timescales

PC4. coordinate with the co-workers to achieve the work objectives efficiently

PC5. prepare the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically

PC6. coordinate with the supervisor or relevant personnel to deal with out of authority tasks and concerns

PC7. mentor and assist subordinates in the execution of their work responsibilities

PC8. identify possible disruptions to work through coordination with the relevant stakeholders and take appropriate preventive measures

PC9. use various resources efficiently to ensure maximum utilisation and minimum wastage

PC10. follow the recommended practices to avoid and resolve conflicts at work

PC11. follow the relevant organisational policies to ensure disciplined behaviour with maximum productivity at work

Communicate effectively with co-workers

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

PC12. follow the organisational policy for the efficient and timely dissemination of information to the authorised personnel

PC13. communicate clearly and politely to ensure effective communication with co-workers

PC14. follow the appropriate techniques for active listening during interactions

Practice inclusion at work

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

PC15. empathise with Persons with Disabilities (PwD)

PC16. adopt gender-neutral behaviour at work

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance and process of effective communication in the workplace

KU2. the barriers to effective communication and how to overcome them

KU3. the importance of teamwork in an organisation's and individual's success

KU4. the importance of active listening in the work environment

KU5. the appropriate techniques to be followed for active listening

KU6. importance of avoiding casual expletives and unpleasant terms while communicating professional circles

KU7. the importance of maintaining discipline and ethical behaviour at work

KU8. the common reasons for interpersonal conflict and how to resolve them

KU9. the importance of developing effective work relationships for professional success

KU10. how expressing and addressing grievances appropriately and effectively

KU11. the importance and process of planning daily tasks to ensure their timely completion and efficient use of time

KU12. the importance of adhering to the limits of authority at work

KU13. the importance of following the applicable quality standards and timescales at work

KU14. the importance of coordinating with the co-workers to achieve the work objectives efficiently

KU15. the relevant documentation requirements

KU16. the importance of providing appropriate information clearly and systematically in work documents

KU17. the escalation matrix to be followed to deal with out of authority tasks and concerns

KU18. the importance and process of mentoring and assisting subordinates in the execution of their work responsibilities

KU19. how to identify possible disruptions to work prevent them

KU20. how to use various resources efficiently to ensure maximum utilisation and minimum wastage

KU21. the recommended practices to be followed at work to avoid and resolve conflicts at work

KU22. the importance and process of efficient and timely dissemination of information to the authorised personnel

KU23. how to communicate clearly and politely to ensure effective communication

KU24. the importance of following the recommended practices to ensure an inclusive environment for PwD and all genders at work

Generic Skills (GS)

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

GS1. maintain work-related notes and records

GS2. read work-related and other relevant literature

GS3. communicate politely and -professionally

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

GS5. plan and prioritise tasks to ensure timely completion

GS6. take prompt decisions to deal with workplace emergencies and accidents

GS7. evaluate all possible solutions to a problem to select the best one

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Work effectively with co-workers	**20**	**43**	**-**	**-**
PC1. plan daily tasks at work to ensure their timely completion and efficient use of time	2	4	-	-
PC2. carry out work responsibilities adhering to the limits of authority	2	4	-	-
PC3. follow the supervisor's instructions to ensure adherence to the applicable quality standards and timescales	2	4	-	-
PC4. coordinate with the co-workers to achieve the work objectives efficiently	2	4	-	-
PC5. prepare the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically	2	4	-	-
PC6. coordinate with the supervisor or relevant personnel to deal with out of authority tasks and concerns	2	4	-	-
PC7. mentor and assist subordinates in the execution of their work responsibilities	2	4	-	-
PC8. identify possible disruptions to work through coordination with the relevant stakeholders and take appropriate preventive measures	2	4	-	-
PC9. use various resources efficiently to ensure maximum utilisation and minimum wastage	2	4	-	-
PC10. follow the recommended practices to avoid and resolve conflicts at work	1	4	-	-
PC11. follow the relevant organisational policies to ensure disciplined behaviour with maximum productivity at work	1	3	-	-
Communicate effectively with co-workers	**6**	**15**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. follow the organisational policy for the efficient and timely dissemination of information to the authorised personnel	2	5	-	-
PC13. communicate clearly and politely to ensure effective communication with co-workers	2	5	-	-
PC14. follow the appropriate techniques for active listening during interactions	2	5	-	-
Practice inclusion at work	**4**	**12**	**-**	**-**
PC15. empathise with Persons with Disabilities (PwD)	2	6	-	-
PC16. adopt gender-neutral behaviour at work	2	6	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N1336
NOS Name	Coordinate with co-workers to achieve work efficiency
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Machining
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

CSC/N0401: Program advanced digital manufacturing Computer Numerically Controlled (CNC) machines.

Description

This OS unit is about programming of Advanced Digital Manufacturing CNC machines for carrying out machining on a variety of components.

Scope

The scope covers the following :

- Prepare for programming the Advanced Digital Manufacturing CNC machine for production
- Program the Advanced Digital Manufacturing CNC machine
- Test and prove the program on the CNC machine
- Use resources optimally

Elements and Performance Criteria

Prepare for programming the Advanced Digital Manufacturing CNC machine for production

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

PC1. determine the job specifications and operational objectives by referring to job cards, work drawings, blueprints, work orders, charts, planning documentation, quality control documents, etc.

PC2. use reference charts, engineering drawings, tables and graphs to get relevant information such as tapping sizes and threads, cutting parameters, feeds, speed, depth of cut, machining tolerances, etc.

PC3. check the process sheet and match it with the received drawings and other specifications

PC4. check the availability of the required tools and measuring instruments

PC5. prepare the part program using the recommended G and M codes, in the appropriate sequence to maintain productivity and component quality

PC6. prepare the work area as per the operations requirements

PC7. follow the job instructions, assembly drawings and laid down procedures

PC8. conduct the preliminary checks to determine the readiness of the program so that the CNC machine operates correctly

PC9. coordinate with the relevant personnel to report and rectify incorrect and inconsistent information in job specification documents

PC10. determine the method for programming the machine for Advanced Digital Manufacturing CNC programming

PC11. identify the tool requirements from the tooling layout and assess their suitability

PC12. select the suitable workholding device as per the job requirement

PC13. ensure the correct and latest part-program is uploaded onto the CNC system

Program the Advanced Digital Manufacturing CNC machine

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

PC14. create the Advanced Digital Manufacturing CNC program with commands for tool motions, spindle motions, miscellaneous functions and tool change, in syntax corresponding to the machine and control system on which the component will be machined

PC15. follow the appropriate method for creating the CNC program, such as text editor or Computer-Aided Manufacturing (CAM) software or controllers on machine

PC16. ensure the part program is efficient and results in minimal cycle time, with optimal cutting parameters and no unnecessary tool motions

PC17. use subprograms and canned cycles to reduce program size and input time, and prevent memory overflow on the machine

PC18. transfer the program to the machine by entering it in the console or transmitting it through a wired link or a data transfer device

PC19. use the part program in single block mode and check the condition of the tool after each operation

PC20. check the coolant has the recommended level and coolant nozzles are positioned appropriately

PC21. check the sequence of the program as per the process sheet

PC22. check spindle and chuck runout and repeatability of all linear axis

PC23. follow the recommended procedures for calling up the program and dealing with any error messages or faults

PC24. identify abnormal noises coming from the machine and component, and adjust the feed and Revolutions Per Minute (RPM), as required

PC25. check the condition of the tools being used, and repair them, as required

PC26. use the relevant Industry 4.0 manufacturing technologies to ensure interconnectivity, automation, machine learning, and real-time data collection and analysis

PC27. follow the approved procedures to resolve problems encountered with the programming, loading and editing activities

PC28. use the appropriate storage medium such as a computer hard disk for saving the proven program

PC29. carry out relevant documentation as per the organizational policy

Test and prove the program on the CNC machine

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

PC30. select and prepare the appropriate tools and equipment for testing and proving the program, ensuring they are not worn-out or damaged

PC31. ensure all the measuring equipment are calibrated and approved for use

PC32. pre-set the tooling appropriately using setting jigs/fixtures

PC33. mount tools in the correct positions in the tool turret or magazine

PC34. check the tools are mounted in positions corresponding to the tool numbers in the part program

PC35. measure tool and work offset data i.e. X and Z offsets for lathes; and work offsets, length offsets and tool radius for machining centres, maintaining the recommended margin for errors

PC36. ensure the component is free of burrs, chips or other materials on its butting surfaces

PC37. mount the part on machine firmly in the specified work holding devices, with the appropriate clamping force

PC38. enter work offset and tool data on the machine X and Z offsets, tool orientation and nose radius for lathes; length offsets and tool radius for machining centres

PC39. ensure that tool data is entered in offset numbers corresponding to the tool offset numbers in the part program

PC40. follow the recommended practices to resolve error messages and faults on the program or equipment

PC41. cut a trial part using single block run, dry run and feed, and speed override controls

PC42. edit the program and adjust tool and wear offsets to correct any dimensional errors on the part

PC43. identify inconsistencies in dimensions due to tool wear, and correct the offsets accordingly

PC44. adjust the machine settings whenever required to maintain the required accuracy

PC45. identify the need of sharpening or replacing the tools

PC46. sharpen or replace the worn-out/ damaged tools, and modify tool offsets according to the new tools, using the necessary equipment and following the relevant safety guidelines and organisational standards

PC47. check the component according to the post-machining sheet to ensure its quality

PC48. ensure the trial part conforms to drawing specifications in terms of dimensions, surface finishes and geometrical parameters such as concentricity, parallelism, runout, etc.

PC49. carry out handover of the machine to the machine operator for machining the batch of parts, along with relevant instructions and documentation on periodic inspection of components, change of worn-out tools

PC50. correct the tool wear offsets based on the results of the periodic inspection, as appropriate

PC51. replace the worn-out tools and indexable inserts, whenever required

PC52. cut a trial part and correct any dimensional inaccuracies by adjusting the tool offsets or wear offsets after every change of a worn-out tool

PC53. ensure there is no damage to the tools/fixtures while performing prove out

PC54. follow the shutdown procedure to return the equipment to a safe condition on the conclusion of activities

PC55. follow the recommended practices to resolve any problems within the limits of authority and control, and report those that cannot be solved to the relevant personnel

PC56. prepare and verify all technical documents for CNC programs

PC57. ensure the availability of all the required tooling information

PC58. perform the appropriate quality assurance tests to ensure the final product meets the design specifications

Use resources optimally

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

PC59. optimize the usage of electricity and other resources in various tasks and processes

PC60. connect the electrical tools and equipment safely, and turn them off when not in use

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the applicable specific safe working practices to be followed

KU2. the concepts and benefits of Industry 4.0 and Industrial Internet of Things (IIoT)

KU3. the CNC programming procedures and environmental regulations that must be observed

KU4. use of the appropriate reference manuals and programming codes to suit the machine controller

KU5. the importance of using the correct and updated version of the program

KU6. the importance of entering the tool and work offsets correctly

KU7. how to ensure that the program does not result in tool collision with the workpiece or work holding devices

KU8. the importance of clamping the workpiece and tools firmly

KU9. the importance of using the correct control program and ensuring it is correctly loaded into the machine controller

KU10. the hazards associated with carrying out the machining operations on a CNC machine and how to minimise them

KU11. the appropriate PPE to be used during machining operations

KU12. the safety mechanism on various machines and how to check if they are functioning correctly

KU13. common terminology used in CNC programming

KU14. various features of CNC programs

KU15. the criteria for selecting the CNC strategies based on material, fixturing, holding and clamping force

KU16. the factors to be considered while selecting tungsten carbide for use, such as hardness of the component material machinability characteristics of the material tolerances to be achieved etc.

KU17. the importance of selecting tools based on material, finish required and tolerances achieved

KU18. the importance of cutter engagement and exit

KU19. relevant factors affecting the tool life

KU20. the importance and effect of the depth of cut, Revolutions Per Minute (RPM) and feed

KU21. how to read and interpret first and third angle component drawings

KU22. how to extract information from engineering drawings or data and related specifications

KU23. how to use the function keys and user interface of the machine control system

KU24. how to determine the entry of work, tool offsets, tool wear data

KU25. the features and working parts of the CNC machine, and the appropriate accessories used with it

KU26. the importance of following specified machining sequences and procedures

KU27. the importance of ensuring the suitability of workpieces/materials and consumables for the specified job and related procedures

KU28. the importance and process to be followed to ensure that tools and equipment are in a safe and usable condition

KU29. the importance of checking the process sheet and matching it with the received drawings and other material

KU30. the importance and process of checking the quality of machined components according to the post-machining sheet to ensure conformance to the applicable quality standards

KU31. how to run the part program in single block mode and the importance of checking the tool condition after each operation

KU32. the importance of maintaining the recommended coolant levels and positioning the coolant nozzles appropriately

KU33. the importance of checking the sequence of the program as per the process sheet

KU34. the importance of checking for the presence of the appropriate tool in the relevant pocket of Automatic Tool Changer (ATC)

KU35. how to identify abnormal noises coming from the machine and component

KU36. how to adjust the feed and Revolutions Per Minute (RPM)

KU37. the importance of checking the condition of tools being used in machining at appropriate intervals during the process

KU38. how to identify inconsistencies in the dimensions due to tool wear and the process of correcting the offsets accordingly

KU39. how to adjust the machine settings to maintain the desired accuracy

KU40. the process of sharpening or replacing the worn-out/ damaged tools, using the necessary equipment

KU41. the importance of modifying the tool offsets according to the new tools replacing them

KU42. the relevant safety guidelines to be followed while sharpening/ replacing the worn-out/damaged tools

KU43. how to perform various CNC operations, and the use of relevant equipment

KU44. the method of setting the workholding devices

KU45. use of various tool holding devices,

KU46. the method of correctly mounting and securing the cutting tools to the tool holders

KU47. how to set the machine controller in the program and editing mode, and enter or download the prepared program

KU48. use of automatic tool changers, pallet changers, rotary tables and part autoloaders

KU49. how to position and identify the tools in relation to the operating program

KU50. relevant error messages and the appropriate actions to be taken to deal with them

KU51. the importance and process of proving the program

KU52. the importance of selecting the correct proving tools

KU53. the importance and process of storing programs on appropriate storage devices safely and correctly, and protecting them from contaminants and electromagnetic sources

KU54. the applicable quality control procedures and the use of relevant equipment

KU55. the importance of identifying and resolving problems promptly

KU56. the importance of writing programs that are easily editable or correctable

KU57. the appropriate methods for the checking quality of machined components against the required quality standards

KU58. how to determine the production cost, machine hour rate, raw material cost, tool cost, coolant cost, overheads, cycle time, idle time, cost of machine idling, part rejection cost

KU59. the criteria for selecting cutting tools, tool materials, chip breaker geometry, cutting parameters from tool catalogues, and coolant

KU60. the relationship between surface finish, tool nose radius and feed rate

KU61. the impact of depth of cut on chatter, surface finish

KU62. various materials used in common engineering applications

KU63. how to identify various materials by their physical properties

KU64. the benefits and methods of resource optimisation

Generic Skills (GS)

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

GS1. maintain work-related notes and records

GS2. read the relevant literature to get the latest updates about the field of work

GS3. communicate politely and professionally

GS4. listen attentively to understand the information being shared

GS5. plan and schedule tasks for efficient time management

GS6. identify possible disruptions to work and take appropriate preventive measures

GS7. take quick decisions to deal with workplace emergencies/ accidents

GS8. evaluate all possible solutions to a problem to select the best one

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for programming the Advanced Digital Manufacturing CNC machine for production	**7**	**13**	**-**	**-**
PC1. determine the job specifications and operational objectives by referring to job cards, work drawings, blueprints, work orders, charts, planning documentation, quality control documents, etc.	1	1	-	-
PC2. use reference charts, engineering drawings, tables and graphs to get relevant information such as tapping sizes and threads, cutting parameters, feeds, speed, depth of cut, machining tolerances, etc.	1	1	-	-
PC3. check the process sheet and match it with the received drawings and other specifications	-	1	-	-
PC4. check the availability of the required tools and measuring instruments	1	1	-	-
PC5. prepare the part program using the recommended G and M codes, in the appropriate sequence to maintain productivity and component quality	-	1	-	-
PC6. prepare the work area as per the operations requirements	-	1	-	-
PC7. follow the job instructions, assembly drawings and laid down procedures	1	1	-	-
PC8. conduct the preliminary checks to determine the readiness of the program so that the CNC machine operates correctly	1	1	-	-
PC9. coordinate with the relevant personnel to report and rectify incorrect and inconsistent information in job specification documents	1	1	-	-
PC10. determine the method for programming the machine for Advanced Digital Manufacturing CNC programming	-	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. identify the tool requirements from the tooling layout and assess their suitability	1	1	-	-
PC12. select the suitable workholding device as per the job requirement	-	1	-	-
PC13. ensure the correct and latest part-program is uploaded onto the CNC system	-	1	-	-
Program the Advanced Digital Manufacturing CNC machine	**9**	**20**	**-**	**-**
PC14. create the Advanced Digital Manufacturing CNC program with commands for tool motions, spindle motions, miscellaneous functions and tool change, in syntax corresponding to the machine and control system on which the component will be machined	1	2	-	-
PC15. follow the appropriate method for creating the CNC program, such as text editor or Computer-Aided Manufacturing (CAM) software or controllers on machine	1	2	-	-
PC16. ensure the part program is efficient and results in minimal cycle time, with optimal cutting parameters and no unnecessary tool motions	1	2	-	-
PC17. use subprograms and canned cycles to reduce program size and input time, and prevent memory overflow on the machine	1	2	-	-
PC18. transfer the program to the machine by entering it in the console or transmitting it through a wired link or a data transfer device	-	1	-	-
PC19. use the part program in single block mode and check the condition of the tool after each operation	1	1	-	-
PC20. check the coolant has the recommended level and coolant nozzles are positioned appropriately	-	1	-	-
PC21. check the sequence of the program as per the process sheet	-	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC22. check spindle and chuck runout and repeatability of all linear axis	1	1	-	-
PC23. follow the recommended procedures for calling up the program and dealing with any error messages or faults	-	1	-	-
PC24. identify abnormal noises coming from the machine and component, and adjust the feed and Revolutions Per Minute (RPM), as required	-	1	-	-
PC25. check the condition of the tools being used, and repair them, as required	1	1	-	-
PC26. use the relevant Industry 4.0 manufacturing technologies to ensure interconnectivity, automation, machine learning, and real-time data collection and analysis	1	1	-	-
PC27. follow the approved procedures to resolve problems encountered with the programming, loading and editing activities	-	1	-	-
PC28. use the appropriate storage medium such as a computer hard disk for saving the proven program	-	1	-	-
PC29. carry out relevant documentation as per the organizational policy	1	1	-	-
Test and prove the program on the CNC machine	**12**	**33**	**-**	**-**
PC30. select and prepare the appropriate tools and equipment for testing and proving the program, ensuring they are not worn-out or damaged	1	2	-	-
PC31. ensure all the measuring equipment are calibrated and approved for use	1	1	-	-
PC32. pre-set the tooling appropriately using setting jigs/fixtures	1	1	-	-
PC33. mount tools in the correct positions in the tool turret or magazine	-	1	-	-
PC34. check the tools are mounted in positions corresponding to the tool numbers in the part program	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC35. measure tool and work offset data i.e. X and Z offsets for lathes; and work offsets, length offsets and tool radius for machining centres, maintaining the recommended margin for errors	1	1	-	-
PC36. ensure the component is free of burrs, chips or other materials on its butting surfaces	1	1	-	-
PC37. mount the part on machine firmly in the specified work holding devices, with the appropriate clamping force	1	1	-	-
PC38. enter work offset and tool data on the machine X and Z offsets, tool orientation and nose radius for lathes; length offsets and tool radius for machining centres	1	1	-	-
PC39. ensure that tool data is entered in offset numbers corresponding to the tool offset numbers in the part program	-	1	-	-
PC40. follow the recommended practices to resolve error messages and faults on the program or equipment	-	1	-	-
PC41. cut a trial part using single block run, dry run and feed, and speed override controls	-	1	-	-
PC42. edit the program and adjust tool and wear offsets to correct any dimensional errors on the part	-	1	-	-
PC43. identify inconsistencies in dimensions due to tool wear, and correct the offsets accordingly	1	1	-	-
PC44. adjust the machine settings whenever required to maintain the required accuracy	-	1	-	-
PC45. identify the need of sharpening or replacing the tools	-	1	-	-
PC46. sharpen or replace the worn-out/ damaged tools, and modify tool offsets according to the new tools, using the necessary equipment and following the relevant safety guidelines and organisational standards	-	1	-	-
PC47. check the component according to the post-machining sheet to ensure its quality	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC48. ensure the trial part conforms to drawing specifications in terms of dimensions, surface finishes and geometrical parameters such as concentricity, parallelism, runout, etc.	-	1	-	-
PC49. carry out handover of the machine to the machine operator for machining the batch of parts, along with relevant instructions and documentation on periodic inspection of components, change of worn-out tools	-	1	-	-
PC50. correct the tool wear offsets based on the results of the periodic inspection, as appropriate	-	1	-	-
PC51. replace the worn-out tools and indexable inserts, whenever required	-	1	-	-
PC52. cut a trial part and correct any dimensional inaccuracies by adjusting the tool offsets or wear offsets after every change of a worn-out tool	1	1	-	-
PC53. ensure there is no damage to the tools/fixtures while performing prove out	-	1	-	-
PC54. follow the shutdown procedure to return the equipment to a safe condition on the conclusion of activities	-	1	-	-
PC55. follow the recommended practices to resolve any problems within the limits of authority and control, and report those that cannot be solved to the relevant personnel	-	1	-	-
PC56. prepare and verify all technical documents for CNC programs	-	2	-	-
PC57. ensure the availability of all the required tooling information	-	2	-	-
PC58. perform the appropriate quality assurance tests to ensure the final product meets the design specifications	1	2	-	-
Use resources optimally	**2**	**4**	**-**	**-**
PC59. optimize the usage of electricity and other resources in various tasks and processes	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC60. connect the electrical tools and equipment safely, and turn them off when not in use	1	2	-	-
NOS Total	**30**	**70**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0401
NOS Name	Program advanced digital manufacturing Computer Numerically Controlled (CNC) machines.
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Design
NSQF Level	5
Credits	7
Version	3.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

CSC/N0415: Assist in process improvements and machine maintenance

Description

This OS unit is about assisting in process improvements through coordination with relevant stakeholders and carrying out routine maintenance of machines.

Scope

The scope covers the following :

- Assist in process improvements
- Assist in machine maintenance

Elements and Performance Criteria

Assist in process improvements

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

PC1. coordinate with the engineering and supervisory personnel to troubleshoot and resolve design, equipment and operating difficulties

PC2. ensure optimal use of the bill of materials for various applications and oversee all process validation functions

PC3. check all designs and find appropriate solutions to reduce manufacturing cost and time

PC4. monitor the CNC programs and ensure accuracy of all instructions through comparison with original blueprints

PC5. design new programs for all production machines to ensure quality

PC6. design program network to increase the efficiency of all programs

PC7. develop new processes to reduce the time for CNC programs and resolve any issues encountered with them

PC8. assist in training all operators in the use of new CNC programs and equipment

Assist in machine maintenance

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

PC9. check each machine periodically to ensure the positioning of drills, mills, and lathes are aligned appropriately

PC10. identify the maintenance needs of machines such as worn-out or damaged parts through periodic inspections

PC11. maintain the machines in optimal working condition through regular and preventative maintenance as per the relevant maintenance checklists

PC12. ensure worn-out and damaged parts are replaced with manufacturer-recommended authentic parts

PC13. perform basic troubleshooting when a machine malfunctions

PC14. follow the manufacturer's instructions for carrying out various maintenance activities such as cleaning and sharpening

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance of coordinating with engineering and supervisory personnel to troubleshoot and resolve design, equipment and operating difficulties

KU2. how to ensure optimal use of materials in various applications

KU3. the importance and process of checking all designs to find appropriate solutions to reduce manufacturing cost and time

KU4. the process of monitoring the CNC programs to ensure accuracy of all instructions through comparison with original blueprints

KU5. the process of designing new programs for all production machines to ensure quality

KU6. the process of designing a program network to increase the efficiency of all programs

KU7. the process of developing new processes to reduce the time for CNC programs and resolve any issues encountered with them

KU8. the importance and process of training all operators in the use of new CNC programs and equipment

KU9. the importance of checking machines periodically to ensure appropriate calibration and identifying maintenance needs

KU10. the importance of replacing the worn-out and damaged parts with manufacturer-recommended authentic parts

KU11. the importance of carrying out regular and preventative maintenance as per the relevant maintenance checklists

KU12. the importance of following the manufacturer's instructions for carrying out various maintenance activities

Generic Skills (GS)

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

GS1. maintain work-related notes and records

GS2. read the relevant literature to learn about the latest developments in the field of work

GS3. communicate politely and professionally

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

GS5. plan and schedule tasks to ensure timely completion

GS6. identify possible disruptions to work and take appropriate preventive measures

GS7. take quick decisions to deal with workplace emergencies/ accidents

GS8. evaluate all possible solutions to a problem to select the best one

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Assist in process improvements	**18**	**40**	**-**	**-**
PC1. coordinate with the engineering and supervisory personnel to troubleshoot and resolve design, equipment and operating difficulties	3	5	-	-
PC2. ensure optimal use of the bill of materials for various applications and oversee all process validation functions	3	5	-	-
PC3. check all designs and find appropriate solutions to reduce manufacturing cost and time	2	5	-	-
PC4. monitor the CNC programs and ensure accuracy of all instructions through comparison with original blueprints	2	5	-	-
PC5. design new programs for all production machines to ensure quality	2	5	-	-
PC6. design program network to increase the efficiency of all programs	2	5	-	-
PC7. develop new processes to reduce the time for CNC programs and resolve any issues encountered with them	2	5	-	-
PC8. assist in training all operators in the use of new CNC programs and equipment	2	5	-	-
Assist in machine maintenance	**12**	**30**	**-**	**-**
PC9. check each machine periodically to ensure the positioning of drills, mills, and lathes are aligned appropriately	2	5	-	-
PC10. identify the maintenance needs of machines such as worn-out or damaged parts through periodic inspections	2	5	-	-
PC11. maintain the machines in optimal working condition through regular and preventative maintenance as per the relevant maintenance checklists	2	5	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. ensure worn-out and damaged parts are replaced with manufacturer-recommended authentic parts	2	5	-	-
PC13. perform basic troubleshooting when a machine malfunctions	2	5	-	-
PC14. follow the manufacturer's instructions for carrying out various maintenance activities such as cleaning and sharpening	2	5	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0415
NOS Name	Assist in process improvements and machine maintenance
Sector	Capital Goods
Sub-Sector	Machine Tools
Occupation	Design
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

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
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
Constitutional values – Citizenship	**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	-	-	-	-
Becoming a Professional in the 21st Century	**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	-	-	-	-
Basic English Skills	**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	-	-	-	-
Career Development & Goal Setting	**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	-	-	-	-
Communication Skills	**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	-	-	-	-
Diversity & Inclusion	**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	-	-	-	-
Financial and Legal Literacy	**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	-	-	-	-
Essential Digital Skills	**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	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Entrepreneurship	**2**	**3**	**-**	**-**
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	**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	-	-	-	-
Getting ready for apprenticeship & Jobs	**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	30/04/2025
Next Review Date	30/04/2028
NSQC Clearance Date	30/04/2025

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for the Qualification Pack will be created by CGSC.

2. Performance Criteria (PC) have been assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.

3. The assessment for the theory part will/may be based on knowledge bank of questions approved CGSC.

4. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

5. Assessment Agencies will create Assessor Guides comprising of Theory and Practical Assessment Set and Guidelines for each examination/training centre (as per assessment criteria below). The same will be approved by CGSC for adequacy.

6. To successfully attain Certification on the Qualification Pack, the trainee must score a minimum of 70% in each Core NOS and minimum of 50% in all non-core NOS. In addition, a candidate needs to attain a minimum overall pass percentage of 70% for certification.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CSC/N1335.Follow the health and safety practices at the work	30	70	-	-	100	15
CSC/N1336.Coordinate with co-workers to achieve work efficiency	30	70	-	-	100	10
CSC/N0401.Program advanced digital manufacturing Computer Numerically Controlled (CNC) machines.	30	70	-	-	100	30
CSC/N0415.Assist in process improvements and machine maintenance	30	70	-	-	100	30
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	15
Total	**140**	**310**	**-**	**-**	**450**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
CNC	Computer Numerically Controlled
NC	Numerically Controlled
VMC	Vertical Machining Center
HMC	Horizonal Machining Center
CAD	Computer Aided Design
2D	2 Dimensional
3D	3 Dimensional
CO2	Carbon Dioxide
CPR	Cardiac Pulmonary Resuscitation
ISO	International Organization For Standardization
PPE	Personal Protective Equipment

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.