Technician Instrumentation

QP Code: CSC/Q0802

Version: 3.0

NSQF Level: 4

Capital Goods Skill Council || 1st Floor, L-29, Outer Circle, Connaught Place
New Delhi – 110001 || email:coo@cgsc.in

Contents

CSC/Q0802: Technician Instrumentation

Brief Job Description

A Technician Instrumentation is responsible for dismantling, repairing and replacing a range of instruments and faulty components in the instrumentation system. The individual is also responsible for setting up test equipment, troubleshooting components of instruments, calibrating them and also preparing service reports, documenting the repair and replacement of parts.

Personal Attributes

The individual must be physically fit to work for long durations with concentration. The person must have attention to detail, strong mathematical skills, and problem-solving skills with the ability to plan and perform own work independently. The individual must also be able to work in coordination with others to achieve the work objectives.

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/N0801: Calibrate hydraulic, pneumatic and mechanical measuring and control equipment](#)

4. [CSC/N0803: Carry out maintenance activities on instrumentation and control equipment](#)

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

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	Machine Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Calibration and Instrumentation
Country	India
NSQF Level	4

Qualification Pack

Credits	16
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7311.67
Minimum Educational Qualification & Experience	8th Class (+ 2-year NTC + 1 Year NAC) with NA of experience OR 10th Class (with 2 years relevant experience) with 2 Years of experience OR 10th Class (+ 1 year NTC) with NA of experience OR Certificate-NSQF (Operator - Calibration and Instrumentation NSQF Level 3.0 certificate with minimum education as 5th Grade pass with 2 years relevant experience) with 2 Years of experience OR Diploma (Completed 1st year of 3-year diploma (after 10th) and pursuing regular diploma) with NA of experience
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	31/03/2025
NSQC Approval Date	31/03/2022
Version	3.0
Reference code on NQR	2022/CCM/CGSC/06609
NQR Version	1

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, CO2, 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

Qualification Pack

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	26/05/2022
Next Review Date	31/03/2025
NSQC Clearance Date	31/03/2022

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	26/05/2022
Next Review Date	31/03/2025
NSQC Clearance Date	31/03/2022

CSC/N0801: Calibrate hydraulic, pneumatic and mechanical measuring and control equipment

Description

This OS unit is about the setting, adjusting and validating mechanical, pneumatic, hydraulic, electrical and electronic measuring and control instruments using the appropriate reference standards and following the approved standard procedures.

Scope

The scope covers the following :

- Prepare the testing equipment
- Test the measuring and control equipment
- Carry out fault management
- Calibrate the measuring and control equipment

Elements and Performance Criteria

Prepare the testing equipment

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

PC1. check various components in the testing equipment for faults, wear and tear or damage

PC2. repair or replace the faulty/ worn-out/ damaged components, as appropriate

Test the measuring and control equipment

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

PC3. determine the test requirements, following the standard procedure

PC4. plan the testing/calibration activities and prepare the appropriate schedules

PC5. check the relevant equipment such as leads and fasteners for faults, wear and tear or damage

PC6. repair or replace the equipment, as appropriate

PC7. inspect the instruments to ensure they are free from damage and unwanted foreign objects

PC8. carry out standard serviceability tests and calibration; special-to-type tests; operational/function checks, and gauge repeatability and reliability tests

PC9. perform the operational/function checks

PC10. conduct the gauge repeatability and reliability tests

PC11. follow the relevant statistical process control methods during the calibration/ testing activities

PC12. inspect and test the operation of instruments and systems using the relevant testing devices to diagnose faults

PC13. select the appropriate test application method and testing equipment after the inspection of instrumentation systems and equipment/components

PC14. determine the device isolation requirements and follow the appropriate device isolation methods

PC15. follow the appropriate test procedures and application principles to assess the operation of instrumentation systems and equipment/components

PC16. identify the instances when testing/calibration activities cannot be completed or defects outside the planned schedule, and report it to the relevant personnel

PC17. use the relevant Industry 4.0 manufacturing technologies to ensure interconnectivity, automation, machine learning, and real-time data collection and analysis

PC18. carry out relevant documentation manually and/ or electronically with respect to the testing/calibration activities

Carry out fault management

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

PC19. analyse and verify the test results against the operational specifications to identify and localise faults

PC20. identify the existing and potential faults following the applicable standard procedure, and report to the relevant personnel as per the SOP

PC21. determine the faulty conditions and plan corrective action

PC22. prepare and document an action plan as per the applicable procedures, including all the relevant information

Calibrate the measuring and control equipment

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

PC23. check the calibration of measuring and control equipment to ensure it is as per the manufacturers' specifications

PC24. calibrate the measuring and control equipment as per the applicable physical standards using the appropriate calibration tools, equipment and techniques

PC25. perform the zero span and range checks on indicators/controllers using the recommended configuration

PC26. carry out appropriate adjustments to the operational specifications using the relevant calibration devices and procedures

PC27. recommission the equipment according to the standard procedure

PC28. coordinate with the relevant personnel to resolve any issues beyond own area of competence or experience

PC29. monitor the problem and update the supervisor about the progress or any delays in resolving the problem

PC30. carry out relevant documentation as per the organisational procedure

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the concepts and benefits of Industry 4.0 and Industrial Internet of Things (IIoT)

KU2. the SOP for calibrating the measuring equipment and the relevant tools and equipment required for that

KU3. the SOP for commissioning the measuring equipment

KU4. the relevant calibration records to be maintained

KU5. the recommended specifications for measuring equipment and components for their optimum functioning

KU6. the use of relevant tools and equipment for checking measuring equipment for faults

KU7. the use of appropriate techniques to check the calibration of the measuring equipment for conformance to specifications

KU8. the process of calibrating the measuring equipment according to the appropriate physical standard

KU9. the process of recommissioning the measuring equipment

KU10. the appropriate checks to be made on the measuring equipment and the use of relevant tools and equipment for the purpose

KU11. how to resolve the common faults found in the measuring equipment

KU12. the impact of faults on the performance/accuracy of the measuring equipment

KU13. the hazards and controls relevant to calibrating the measuring equipment

KU14. the functionality of the measuring equipment and the recommended tolerance levels for calibration

KU15. the applicable instrumentation principles such as controlling density, level, flow, temperature, composition and arrangement of materials

KU16. the principles of hydraulic and pneumatic flow

KU17. the application principles for assessing the operation of instrumentation systems and equipment/components

KU18. the procedure and use of relevant equipment for inspecting and testing instrumentation system

KU19. the calibration procedures for instrumentation systems and equipment/ components

KU20. the purpose and functions of instrumentation system

KU21. the specifications of different types of instrumentation system and the acceptable deviations from specifications

KU22. the procedure for repairing faulty instrumentation system

KU23. the relevant techniques for dismantling, testing and reassembling an instrumentation system

KU24. the correct operation of the instrumentation system and the procedure for isolating instrumentation systems

KU25. different types of faults found in an instrumentation system and equipment components

KU26. the process for checking and verifying the operational function of the instrumentation system and equipment

KU27. the process of recording and completing service reports

KU28. the operational specifications of the instrumentation system and equipment

KU29. how to resolve variations between test results and operational specifications

KU30. the causes of common faults found in the instrumentation system and equipment components

KU31. the appropriate corrective action to be taken to rectify the causes of faults in the instrumentation systems and equipment

KU32. the process of correcting faults in the instrumentation system and equipment components

KU33. the importance and process of reporting the unresolved faults

KU34. the difference between real and potential faults

KU35. the process for documenting test and calibration results

KU36. the function and process of carrying out zero-and-span checks on instrumentation systems and equipment

KU37. the relevant equipment required to carry out the calibration of instrumentation systems and equipment

KU38. the instrumentation control equipment to be checked for weight, such as mechanical system, load cells/strain gauges, transducers, etc.

KU39. the speed measurement and control equipment to be checked, such as mechanical governors, valves and valve mechanisms including control valves, valve actuators and positioners, etc.

KU40. use of various and testing and calibration tools such as pressure gauge, standard test gauge, micrometre, jigs and fixtures, insulation testers, calibrated weights, Vernier calliper, deadweight tester, manometer, gyroscope, etc.

KU41. the relevant documentation to be completed such as job card, progress report, incident report, calibration labels, test reports, nonconforming calibration reports, calibration certificates, etc.

KU42. the relevant calibration records to be maintained

KU43. the measuring equipment specifications, their use, connections and components

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 the testing equipment	**2**	**4**	**-**	**-**
PC1. check various components in the testing equipment for faults, wear and tear or damage	1	2	-	-
PC2. repair or replace the faulty/ worn-out/ damaged components, as appropriate	1	2	-	-
Test the measuring and control equipment	**16**	**48**	**-**	**-**
PC3. determine the test requirements, following the standard procedure	1	3	-	-
PC4. plan the testing/calibration activities and prepare the appropriate schedules	1	3	-	-
PC5. check the relevant equipment such as leads and fasteners for faults, wear and tear or damage	1	3	-	-
PC6. repair or replace the equipment, as appropriate	1	3	-	-
PC7. inspect the instruments to ensure they are free from damage and unwanted foreign objects	1	3	-	-
PC8. carry out standard serviceability tests and calibration; special-to-type tests; operational/function checks, and gauge repeatability and reliability tests	1	3	-	-
PC9. perform the operational/function checks	1	3	-	-
PC10. conduct the gauge repeatability and reliability tests	1	3	-	-
PC11. follow the relevant statistical process control methods during the calibration/ testing activities	1	3	-	-
PC12. inspect and test the operation of instruments and systems using the relevant testing devices to diagnose faults	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. select the appropriate test application method and testing equipment after the inspection of instrumentation systems and equipment/components	1	3	-	-
PC14. determine the device isolation requirements and follow the appropriate device isolation methods	1	3	-	-
PC15. follow the appropriate test procedures and application principles to assess the operation of instrumentation systems and equipment/components	1	3	-	-
PC16. identify the instances when testing/calibration activities cannot be completed or defects outside the planned schedule, and report it to the relevant personnel	1	3	-	-
PC17. use the relevant Industry 4.0 manufacturing technologies to ensure interconnectivity, automation, machine learning, and real-time data collection and analysis	1	3	-	-
PC18. carry out relevant documentation manually and/ or electronically with respect to the testing/calibration activities	1	3	-	-
Carry out fault management	**4**	**8**	**-**	**-**
PC19. analyse and verify the test results against the operational specifications to identify and localise faults	1	2	-	-
PC20. identify the existing and potential faults following the applicable standard procedure, and report to the relevant personnel as per the SOP	1	2	-	-
PC21. determine the faulty conditions and plan corrective action	1	2	-	-
PC22. prepare and document an action plan as per the applicable procedures, including all the relevant information	1	2	-	-
Calibrate the measuring and control equipment	**8**	**10**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC23. check the calibration of measuring and control equipment to ensure it is as per the manufacturers' specifications	1	1	-	-
PC24. calibrate the measuring and control equipment as per the applicable physical standards using the appropriate calibration tools, equipment and techniques	1	1	-	-
PC25. perform the zero span and range checks on indicators/controllers using the recommended configuration	1	1	-	-
PC26. carry out appropriate adjustments to the operational specifications using the relevant calibration devices and procedures	1	1	-	-
PC27. recommission the equipment according to the standard procedure	1	1	-	-
PC28. coordinate with the relevant personnel to resolve any issues beyond own area of competence or experience	1	1	-	-
PC29. monitor the problem and update the supervisor about the progress or any delays in resolving the problem	1	2	-	-
PC30. carry out relevant documentation as per the organisational procedure	1	2	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0801
NOS Name	Calibrate hydraulic, pneumatic and mechanical measuring and control equipment
Sector	Capital Goods
Sub-Sector	Machine Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Calibration and Instrumentation
NSQF Level	4
Credits	5
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2025
NSQC Clearance Date	31/03/2022

CSC/N0803: Carry out maintenance activities on instrumentation and control equipment

Description

This OS unit is about carrying out maintenance activities on instrumentation and control equipment according to the approved procedures. It also covers resource optimisation.

Scope

The scope covers the following :

- Prepare for the maintenance activities
- Carry out the maintenance activities
- Coordinate with the supervisor
- Use resource optimally

Elements and Performance Criteria

Prepare for the maintenance activities

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

PC1. prepare and update the relevant maintenance schedules and plans

PC2. perform appropriate risk assessments before testing and maintenance activities

PC3. coordinate with the operations and production teams to ensure the availability of critical systems and spares parts

Carry out the maintenance activities

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

PC4. use the correct and approved version of the company and/or manufacturer's drawings and maintenance documentation

PC5. follow the instructions in manufacturers' manuals to perform test and maintenance activities

PC6. follow the recommended maintenance schedules for critical systems, logging all repairs and inspections

PC7. carry out the maintenance activities on a range of instrumentation and control equipment, following the appropriate techniques and procedures

PC8. check the technical and mechanical systems to ensure their operation within the specified parameters

PC9. conduct instrumentation evaluation for hydraulic, pneumatic, mechanical, electrical and electronic measuring and control equipment

PC10. identify non-operational and malfunctioning systems in a timely manner to prevent any damage or loss

PC11. conduct the appropriate tests related to the functional performance of instruments, as required

PC12. test the instrumentation system operations to diagnose problems

PC13. use the appropriate scientific and analytic computer software, calculators, electronic probes, voltage and current meters to diagnose faults in circuitry

PC14. coordinate with the relevant personnel to evaluate the functioning of routine and emergency instruments and equipment

PC15. use the relevant testing devices to measure and control pressure, flow, temperature, level, motion, force, and chemical makeup

PC16. adjust the system components and replace the defective parts, as required

PC17. coordinate with engineers and process technicians to resolve the issues requiring their assistance

PC18. recommission the instrumentation system appropriately, to return it to service following repair and replacement activities

PC19. ensure compliance with the applicable policies, standards, and environmental and safety requirements while carrying out the required instrument maintenance or replacement activities

PC20. follow the applicable organisational procedure for the resolution of defects outside the planned schedule

PC21. carry out troubleshooting for test failures to determine root causes and develop processes to avoid repeat failure

PC22. carry out appropriate documentation to record the relevant information regarding the maintenance activities

PC23. follow the recommended practices to reduce the cost of repairing instruments and equipment while maintaining the quality of repairs

Coordinate with the supervisor

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

PC24. monitor the problem and update the superior about progress or any delays in resolving the problem

PC25. coordinate with the supervisor or relevant expert to resolve any issues which are out of authority or area of competence

PC26. identify appropriate improvements to the maintenance procedures and coordinate with the supervisor for their implementation

Use resources optimally

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

PC27. optimise the usage of electricity and other resources in various tasks and processes

PC28. 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 appropriate documentation to be carried out, such as job card, work permit, risk assessment, sign-on/off, maintenance logs, etc.

KU2. the applicable isolation and lock-off procedures or permit-to-work procedure that applies

KU3. the relevant health and safety precautions to be taken during the maintenance process

KU4. how to minimise risks from the hazards associated with carrying out mechanical maintenance activities, such as handling oils, greases, stored pressure/force, use of complex tools and equipment

KU5. the importance of using the relevant Personal Protective Equipment (PPE) clothing during the maintenance activities

KU6. how to interpret drawings, specifications, manufacturers manuals and other documents needed during the maintenance process

KU7. the functioning of different process plants and the appropriate measuring and control equipment

KU8. the process to be adopted to establish the background of the fault

KU9. how to evaluate various types of information available for fault diagnoses such as operator-provided information, equipment self-diagnosis, and testing instrument measurements

KU10. use of various testing instruments such as multimetre, oscilloscope, logic probe, signal tracer, signal generator, etc.

KU11. use of various aids for fault diagnosis such as logic diagrams: fault analysis charts, flow charts or algorithms, manufacturers' manuals, probability charts, computer-aided test equipment, electronic aids, etc.

KU12. the application of various fault finding techniques such as half-split technique, input/output technique, injection and sampling, six-point technique, emergent sequence, unit substitution, function/performance testing: equipment self-diagnostics, etc.

KU13. how to evaluate sensory conditions i.e. sight, sound, smell, touch

KU14. how to analyse evidence and evaluate possible characteristics and causes of specific faults/problems

KU15. how to relate to the previous reports/records of similar fault conditions

KU16. how to evaluate the likely risk of running the equipment with the displayed fault, and the effects the fault could have on health and safety, and on the overall process or system

KU17. the process of handling and maintaining instrumentation test instruments

KU18. how to check that test instruments are within current calibration dates, and that they are free from damage and defects

KU19. the relevant precautions to be taken to prevent Electrostatic Discharge (ESD) damage to electronic circuits and components

KU20. basic principles of operation of the instrumentation and control equipment

KU21. how the instrumentation system functions and its operating sequence

KU22. the working purpose of individual units/components such as gauges and meters and how they interact

KU23. the importance of ensuring the control systems are isolated or put into manual control, and appropriate trip locks, keys or program overrides are inserted before removing any sensors or instruments from the system

KU24. the process of identifying and selecting instrument sensors, including how to identify their markings: calibration information: component values: operating parameters and working range

KU25. the appropriate way of fitting instruments to avoid faulty readings caused by head correction, poor flow past sensor, blockages, incorrect wiring, poor insulation or incorrect materials

KU26. the process of installing and connecting external wiring and components safely to avoid electronic interference or mechanical damage

KU27. how to carry out visual checks of the instruments including checking for leaks, security of joints and physical damage

KU28. the relevant replacement parts, materials and other items required for the maintenance process

KU29. the relevant techniques used to dismantle/assemble integrated equipment i.e. release of pressures/force, proof marking to aid reassembly, plugging exposed pipe/component openings, dealing with soldered joints, screwed, clamped and crimped connections

KU30. the importance and process of attaching identification marks/labels to removed components or cables, to assist with reassembly

KU31. the applicable methods for checking components are fit for purpose, and the need to replace electronic modules, sensors, transmitters, transducers, electronic boards and other failed items

KU32. how to check that tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured correctly for their intended purpose

KU33. the equipment operating and control procedures to be applied during the maintenance activity

KU34. how to resolve the common problems encountered during the maintenance of the instrumentation and control system

KU35. how to adopt a systematic Plan-Do-Check-Act (PDCA) approach for solving problems and improving business

KU36. the importance of making process improvements by engaging the relevant stakeholders

KU37. how to create and update the SOPs, maintenance schedules and plans

KU38. the techniques used to communicate information using visual control systems such as card systems, colour coding, floor footprints, graphs and charts, team boards, tool/equipment shadow boards, etc.

KU39. the process of carrying out different types of maintenance such as preventive, corrective, predictive and reactive maintenance, and the activities these entail

KU40. 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. listen attentively to understand the information/ instructions being shared

GS4. communicate politely and professionally

GS5. plan and prioritise tasks to ensure timely completion

GS6. evaluate all possible solutions to a problem to select the best one

GS7. coordinate with the co-workers to achieve the work objectives

GS8. identify possible disruptions to work and take appropriate preventive measures

GS9. take quick decisions to deal with workplace emergencies/ accidents

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for the maintenance activities	**3**	**9**	**-**	**-**
PC1. prepare and update the relevant maintenance schedules and plans	1	3	-	-
PC2. perform appropriate risk assessments before testing and maintenance activities	1	3	-	-
PC3. coordinate with the operations and production teams to ensure the availability of critical systems and spares parts	1	3	-	-
Carry out the maintenance activities	**20**	**44**	**-**	**-**
PC4. use the correct and approved version of the company and/or manufacturer's drawings and maintenance documentation	1	3	-	-
PC5. follow the instructions in manufacturers' manuals to perform test and maintenance activities	1	2	-	-
PC6. follow the recommended maintenance schedules for critical systems, logging all repairs and inspections	1	2	-	-
PC7. carry out the maintenance activities on a range of instrumentation and control equipment, following the appropriate techniques and procedures	1	2	-	-
PC8. check the technical and mechanical systems to ensure their operation within the specified parameters	1	3	-	-
PC9. conduct instrumentation evaluation for hydraulic, pneumatic, mechanical, electrical and electronic measuring and control equipment	1	2	-	-
PC10. identify non-operational and malfunctioning systems in a timely manner to prevent any damage or loss	1	2	-	-
PC11. conduct the appropriate tests related to the functional performance of instruments, as required	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. test the instrumentation system operations to diagnose problems	1	2	-	-
PC13. use the appropriate scientific and analytic computer software, calculators, electronic probes, voltage and current meters to diagnose faults in circuitry	1	2	-	-
PC14. coordinate with the relevant personnel to evaluate the functioning of routine and emergency instruments and equipment	1	2	-	-
PC15. use the relevant testing devices to measure and control pressure, flow, temperature, level, motion, force, and chemical makeup	1	2	-	-
PC16. adjust the system components and replace the defective parts, as required	1	2	-	-
PC17. coordinate with engineers and process technicians to resolve the issues requiring their assistance	1	2	-	-
PC18. recommission the instrumentation system appropriately, to return it to service following repair and replacement activities	1	2	-	-
PC19. ensure compliance with the applicable policies, standards, and environmental and safety requirements while carrying out the required instrument maintenance or replacement activities	1	2	-	-
PC20. follow the applicable organisational procedure for the resolution of defects outside the planned schedule	1	2	-	-
PC21. carry out troubleshooting for test failures to determine root causes and develop processes to avoid repeat failure	1	2	-	-
PC22. carry out appropriate documentation to record the relevant information regarding the maintenance activities	1	3	-	-
PC23. follow the recommended practices to reduce the cost of repairing instruments and equipment while maintaining the quality of repairs	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Coordinate with the supervisor	**3**	**9**	**-**	**-**
PC24. monitor the problem and update the superior about progress or any delays in resolving the problem	1	3	-	-
PC25. coordinate with the supervisor or relevant expert to resolve any issues which are out of authority or area of competence	1	3	-	-
PC26. identify appropriate improvements to the maintenance procedures and coordinate with the supervisor for their implementation	1	3	-	-
Use resources optimally	**4**	**8**	**-**	**-**
PC27. optimise the usage of electricity and other resources in various tasks and processes	2	4	-	-
PC28. connect the electrical tools and equipment safely, and turn them off when not in use	2	4	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0803
NOS Name	Carry out maintenance activities on instrumentation and control equipment
Sector	Capital Goods
Sub-Sector	Machine Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Calibration and Instrumentation
NSQF Level	4
Credits	6
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2025
NSQC Clearance Date	31/03/2022

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	NA
Next Review Date	24/02/2025
NSQC Clearance Date	24/02/2022

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 70% 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/N0801.Calibrate hydraulic, pneumatic and mechanical measuring and control equipment	30	70	-	-	100	35
CSC/N0803.Carry out maintenance activities on instrumentation and control equipment	30	70	-	-	100	35
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	5
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
OEE	Overall Equipment Effectiveness
ESD	Electrostatic Discharge
PDCA	Plan Do Check Act
SOP	Standard Operating Procedure
ERP	Enterprise Resource Planning
AC/ DC	Alternating Current / Direct Current
RLC	Units Of Resistance, Inductance And Capacitance Respectively
CO2	Carbon Dioxide
CPR	Cardiac Pulmonary Resuscitation
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.